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THE USE OF THE CYSTO-URETHROGRAM IN THE DIAGNOSIS OF VARIOUS CONDITIONS IN THE LOWER PORTION OF THE URINARY TRACT.

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THE cysto-urethrogram is a method of investigation comparatively little used in the diagnosis of anomalies and disease of the lower portion of the urinary tract. Its convenience and simplicity of use and the lack of inconvenience and trauma to the patient, coupled with the value of the information received, make it a measure worthy of much consideration and one to be used as a routine method of diagnosis in such conditions.

HISTORICAL

With the advent of radiology as a science the urinary tract was one of the first systems in the body on which investigations were conducted. Various methods of demonstrating changes in the hollow structures forming the collecting and transmitting portions of the tract were introduced. In 1897 Tuffler proposed the introduction into the ureter of opaque catheters, prior to the taking of the radiograph. This method was elaborated by Fenwick, Cunningham, Keyes and various others. Pyelography was introduced by Voelcher and Lichtenberg in 1906 with the injection into the renal pelvis of a 2% solution of collargol. Owing, no doubt, to the presence in the armamentarium of urological investigation of the informative cystoscope and urethroscope, no attempt was made to use the radiograph in the study of the lower portion of the urinary tract until

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Cunningham of Boston, in 1910, filled the anterior part of the urethra with a 50% argyrol solution.

Blum, Eisher and Hryntschak of Vienna, in 1920, having filled the bladder with an opaque solution, studied the movements of the bladder during the act of micturition. Pfleiderer, in 1920, using a solution of barium sulphate, demonstrated in films pathological conditions of the urethra and bladder. None of these earlier workers had been able to demonstrate the posterior part of the urethra, and it was not until Hudeck and Priegl, in 1921, proved the necessity for taking pictures whilst the opaque fluid was still flowing, that a study of this portion of the urinary tract became possible. In 1924 Sicard and Forestier improved the technique of this manoeuvre to its present day standard by suggesting Lipiodol as the opaque fluid for use in the urethral portion of the investigation.

TECHNIQUE

In all cases investigation includes both the bladder and the urethra. It is advisable that a low enema be given immediately prior to the radiographic examination. With the patient in the supine position, a plain X-ray film is taken. Subsequently, with suitable aseptic precautions, the bladder is filled with an opaque solution. Such a solution for use in cystography must be non-irritating and non-toxic; further, it must have the capacity of being readily miscible with urine and easily sterilized. Bladder pain, haematuria and frequency of micturition may be induced by unsuitable solutions, and a chemical urethritis may ensue. The best results, when all these factors are taken into consideration, have been obtained by the use of a solution of sodium iodide. For ordinary routine use the strength is 4%; but when the bladder is large and the greater depth of opaque fluid may possibly destroy the filling defect of a prostatic enlargement or bladder tumour, weaker solutions may be used. The filling is accomplished by means of a Bonneau syringe modified to permit the

attachment of a manometer (Figure 1). From the upper end of the glass barrel, rubber pressure tubing is fitted on to a glass nipple and connected with the manometer of a blood pressure apparatus. A glass trap is inserted close to the syringe to prevent any of the solutions used from coming in contact with the mercury of the manometer. The rubber bulb is gently compressed and the anterior portion of the urethra is filled. The mercury rises in the manometer, generally to 100 or 150 millimetres, and an increase in pressure is felt under the finger on the bulb. Maintenance of this pressure is followed by relaxation of the external sphincter, which is evidenced in the manometer by a slight fall in pressure. The fluid then runs smoothly, the pressure remaining constant, until the patient complains of slight discomfort or a desire to micturate. With the tube centred just above the pubis and having a slight tilt downwards, the second picture is then taken. If this gives any indication of diverticulum or tumour formation, a lateral or oblique view is obtained. The patient then micturates, and the subsequent picture taken with the same technique gives a visual demonstration of the amount of residual urine, if any, and (if diverticulum formation is present) information as to whether stasis exists in the diverticulum.

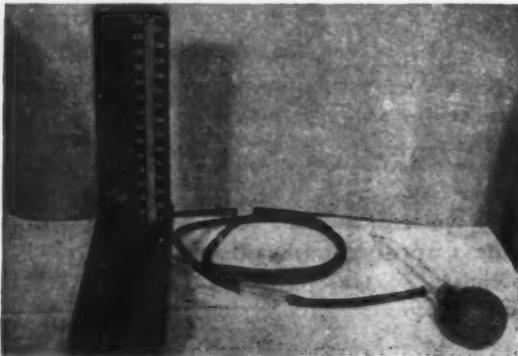


FIGURE I.
Showing Baumanometer attachment to Bonneau's glass syringe with glass trap in circuit.

The taking of the urethrogram is then proceeded with. The patient is now placed in a right lateral position at an angle of 30°, the left leg is extended and the right leg is flexed to a right angle, with the penis extended below and parallel to the thigh. The urethra is then filled with Lipiodol or "Neo-Hydriol" (viscous) by means of a smaller syringe of a Bonneau type with manometer attachment, and the anterior portion of the urethra having been filled, a picture is taken whilst the solution is flowing through the posterior part of the urethra, the muscular tonus of the external sphincter having been overcome by gentle and constant pressure. Owing to the extra viscosity of this fluid, a greater pressure is easily obtained, particularly in cases of stricture of the urethra, and in such circumstances the increase in pressure on the bulb must be made more gradually. The use of these oily solutions increases the tendency to leakage; but firm pressure of the blunt tip of the syringe against the meatus will produce adequate apposition. It is essential during the whole of this procedure that the hands be protected from the harmful effects of the rays by the use either of gloves or of lead strips.

Dangers and Difficulties.

In the first part of the procedure (the taking of the cystogram), during the instillation of an opaque solution it may be found that the manometer pressure rises to 250 or 300 millimetres of mercury or even higher. As the risk of extravasation is always present at these higher pressures, a cause of obstruction to the flow should be sought before any greater rise is permitted. Spasm of the external

sphincter induced by trauma or roughness of handling, or perhaps due to lack of cooperation on the part of the patient, is a common cause, as also is the presence of a tight stricture. Extravasation of this nature is demonstrated in Figure IV; in this case of stricture the injection was made without the use of a manometer. No untoward results occurred.

Cases of oil embolism during the taking of the urethrogram, some of them with fatal results, have been reported to follow the use of uncontrolled injections of oily solutions. With manometric control of intraurethral pressure, as in the technique outlined above, this danger becomes minimal. The possibility of embolism and extravasation suggests the necessity for making the urethrographic examination prior to any other exploration or sounding of the urethra. It is hardly necessary to add that the procedure is contraindicated in the presence of acute infection.



FIGURE II.
Normal urethrogram.

INTERPRETATION OF THE FILMS

The normal urethra presents a reasonably constant picture, the outlines being sharply defined and regular (Figure II). The calibre varies with the anatomical areas of dilatation and narrowing, being widest in the bulb and



FIGURE III.
Normal cystogram.

diminishing noticeably as the membranous urethra is approached. In the antero-posterior view the shadow of the bulbous urethra may be tortuous, owing to the super-

imposition of shadows; but the lateral view shows what is described as the "onion-bulb" appearance, which is much accentuated in spasm of the membranous sphincter. The membranous urethra is, as a rule, clearly defined, being represented as a narrow triangle with the base downward. Above this is the shadow of the posterior part of the urethra, which is always narrower than that of the anterior part, being apparently constricted at either end and widest in the middle. Here a filling defect due to the presence of the verumontanum is almost constantly seen. In an antero-posterior view, the posterior urethral shadow lies over the *symphysis pubis* and terminates at right angles to the bladder base. In the oblique view the shadow overlies the pubic ramus and meets the bladder shadow at a varying angle, generally obtuse. Having filled the urethra, the opaque fluid then spreads out over the base of the bladder. The normal bladder as represented in the cystogram (Figure III) is rounded and regular with the base parallel to the pubic margin, and in views taken according to the technique outlined above, this border of the bladder abuts upon the pubes.

DIAGNOSIS.

Diverticulum of the Bladder.

The factors necessary for a complete diagnosis of bladder diverticulum are the appreciation of the presence, position and size of the diverticulum, whether it is single or multiple, and whether emptying is complete on micturition. Some of these factors may be elucidated by cystoscopy combined with X-ray examination following the introduction of an opaque catheter into the diverticulum; but all of them may be discovered by the use of the cystogram. If the original film with the bladder filled suggests the presence of one or more diverticula (Figure V), oblique films may be necessary to determine the exact position and size, and the film taken after micturition will give the all-important information as to whether the diverticulum empties or not (Figure VI). This procedure, combined with excretion pyelography, may give important information in a lateral view concerning the relation of the ureter to any diverticulum that may be present.

Carcinoma of the Bladder.

Cystograms should be taken in all cases of bladder tumours except small papillomata. Occasionally cystography may serve as the only diagnostic procedure (Figure VII). Introduction of the cystoscope may be impossible owing to previous operative procedure or to inroads of the growth on the bladder neck and urethra. The cystoscope may again fail in its diagnostic role through poor visibility due to massive disease or to haemorrhage. The patient may refuse to submit to its use. Cystitis or infiltration may render the bladder small and intolerant. Even when the diagnosis has been established by cystoscopy, cystography may give valuable information as to the extent and degree of fixation of the bladder wall in the neighbourhood of the tumour (Figure VIII). Oblique views may be necessary, and care must be taken to prevent over-distension and the consequent spasm of the bladder wall, which may closely mimic infiltration of the vesical wall by malignant disease.

Stone in the Bladder.

Whilst the procedure of cystography is never used primarily in the diagnosis of stone, yet in some cases during its routine use a non-opaque calculus may be disclosed as a filling defect in the cystographic medium, or after micturition the deposit of sodium iodide on the surface of the stone may be sufficient to render its presence obvious.

Fistula of the Bladder.

Fistulous communication between the bladder and any part of the intestinal canal that may come in contact with it, may, if the fistulous opening is of sufficient size, be delineated by the medium used in cystography (Figure IX). From the character of the filling in the bowel and its position, the portion of the intestine involved may often be ascertained.

Cord Bladder.

The outline of the bladder in tabes usually has an irregularity due to trabeculation characteristic of the disease, but may also be perfectly regular. There is often a pearl-like appearance of the bladder with the base downwards, which, with this irregularity, gives rise to the so-called "Christmas tree" appearance (Figure X). The funnel-shaped vesical outlet is demonstrated by an extension of the cystographic medium into the posterior part of the urethra.

Bladder Neck Obstruction due to Prostatic Disease.

With the common acceptance among urological surgeons of perurethral resection as an alternative method to the time-honoured suprapubic approach in the surgical treatment of the prostate and the less used perineal route, a more accurate diagnosis of the site of the encroaching prostate and an evaluation of the lobes involved and their size become matters of considerable importance. It is on a consideration of these factors that a decision as to the advisability of the use of this newer method often depends. It is not proposed in this paper to discuss the merits or demerits of the various endoscopic procedures devised to relieve prostatic obstruction. Suffice it to say that perurethral resection is accepted by all surgeons as having real value in the fibrous bar type of obstruction, in generalized sclerosis of the bladder neck and in malignant tumours that are causing obstruction. The more enthusiastic, or perhaps the more experienced in the operation, will use it for smaller medium types of so-called adenomatous enlargement, particularly that involving the middle lobe. The average opinion is that in the types of obstruction enumerated above the indications for the operation cease. It is well recognized, however, that there are surgeons in various parts of the world who are prepared to use the operation in practically all cases of prostatic enlargement and are able to produce large series of figures evidencing excellent results. If we accept what are regarded as average opinions, it becomes obvious that the type, size and position of the prostatic enlargement must be known before a decision can be reached as to what type of operation is most suitable. For this purpose, three methods of investigation are at the disposal of the operator.

Finger Palpation of the Prostate Gland per Rectum.

Finger palpation of the prostate *per rectum* is notoriously fallacious, as it is well recognized that whilst in some cases the "rectal" size of the prostate corresponds with the "obstructing", yet in many cases this may not be so. A large middle lobe, the spear-shaped Albarran's lobe and the fibrous bar are not revealed by finger palpation, and it is only in the presence of the very large Grade III or IV prostate that the information obtained from the rectum gives a reasonably accurate determination of its size.

The Use of the Cysto-urethroscope.

It has been customary therefore to attempt an evaluation of the essentials to diagnosis by means of the cysto-urethroscope. Instrumentation of any kind is fraught with considerable danger in a suspected case of obstruction in the lower portion of the urinary tract. One often sees the passage of a cystoscope produce profuse bleeding from a fleshy or fibrous prostate even in the hands of the most expert operator. The congestion induced by instrumentation may precipitate an acute attack of retention of urine with its attendant risks and dangers, and the trauma produced by this procedure may end in an infection of sterile urine or a flare-up of an already present infection. Again, the information obtained by the use of the right-angled lens system in general use is quite inadequate for the estimation of the degree and site of prostatic obstruction. When resection is considered as a possible method of treatment, the information obtained from an inspection of the posterior part of the urethra is of far more importance than the appearance of the bladder. The foroblique lens system is necessary for an accurate summing-up of the amount of intravesical and intra-urethral obstruction. The use of the instrument incor-

porating this telescope, and its manipulation in the posterior portion of the urethra (always a difficult area in which to obtain satisfactory anaesthesia by surface methods), are far more painful than ordinary cystoscopy and demand some complete form of anaesthesia.

Cysto-urethrography.

The third method of investigation involves the use of the cysto-urethrogram. The interpretation of the amount and position of prostatic encroachment is as a rule not difficult.

Simple Enlargement.—The presence of a middle lobe is suggested in the cystogram by a filling defect arising from the region of the base of the bladder for a variable distance (Figures XI and XII). When the middle lobe only is involved, the base of the bladder is situated just above the pubes. In the urethrogram, acuteness of the angle made by the urethra at the bladder neck may be associated with a deformity caused by the bulge forward of the middle lobe (Figure XIII). In lateral lobe involvement the cysto-urethrographic picture is a faithful reproduction of the various changes seen in the posterior part of the urethra due to the enlargement. There appear in the film elongation of the urethra, as measured by the increase in distance from the membranous urethra to the bladder neck, and elevation of the bladder base above the pubes caused by the elongation (Figure XIV). Enlargement of the two lateral lobes produces an increase in the antero-posterior diameter of the posterior portion of the urethra as seen in the lateral view. The change in the direction of the urethra caused by the unequal development of the two lobes sometimes produces an S-shaped curve with enlargement predominating strongly on one side. The film taken after micturition gives a pictorial representation of the amount of residual urine (Figure VI). The urethrogram thrown against this picture of residual urine lying in the *bas-fond* in most cases shows clearly the amount of projection of prostatic tissue into the bladder (Figure XIV).

Bar Formation and Sclerosis of the Bladder Neck.—The group of cases of bar formation and sclerosis of the bladder neck provides the least satisfactory cysto-urethrographic evidence. The absence of evidence of stricture and of simple or malignant enlargement of the prostate, as portrayed by the cysto-urethrogram considered with the history of bladder neck obstruction, suggests the diagnosis. Confirmation is obtained at cystoscopy, which immediately precedes the perurethral resection necessary for the relief of the patient's symptoms. Occasionally one will obtain positive evidence of this type of lesion in the form of shortening of the posterior part of the urethra and narrowing of the vesical outlet associated with enlargement of the bladder with sacculation and formation of diverticula.

Malignant Disease of the Prostate.—Malignant disease of the prostate modifies but slightly the cysto-urethrographic appearance as shown by the simple enlargement. On occasion the urethra may appear narrowed and display the irregularity characteristic of malignant disease.

Stricture of the Urethra.

Positive evidence is obtained from the urethrogram as to the presence of stricture of the urethra. The films make it possible to estimate the position of the lesion, the calibre of the urethra at this site, the length of urethra involved and any complicating factors present in the urethra below, at the site of the stricture or above it. For instance, chronic urethritis of the anterior portion of the urethra is evidenced by an inelastic appearance of the outline, which is often serrated, owing to the presence of chronically inflamed follicles and lacunae along the route of the urethra. At the site of the stricture false passages may be obvious, and sinus and diverticulum formation may be seen in relation to it. Concomitant pathological conditions, such as chronic prostatitis, bladder neck obstruction due to prostatic enlargement or sclerosis, or diverticulum formation of the bladder, may be displayed (Figures XV, XVI, XVII, XVIII, XIX, XX). It will be obvious that this wealth of information is available only

by the use of urethrography, and it has become a rule with the writer that exact radiographic evidence of the condition of the lower portion of the urinary tract must be obtained before any instrumentation is performed. This permits an estimation of the possibility of dilatation as a method of treatment for the particular stricture, and provides information as to the possible difficulties with which the manoeuvre may be associated. Should dilatation appear impracticable owing to the narrowness or length of the stricture, an accurate indication as to the most suitable surgical procedure is obtained. Failure to diagnose associated lesions—for example, chronic infection or abscesses of the prostate, bladder neck sclerosis and diverticulum formation—is a common cause of the chronic pyuria with its attendant symptoms and risks that is an almost constant accompaniment of long-standing urethral strictures even after satisfactory treatment has been given to the stricture itself.

Prostatitis.

Interesting and valuable information concerning the abnormalities within the prostate gland in association with chronic prostatitis is obtained by the use of the urethrogram. Two main forms of prostatitis are seen at X-ray examination. Firstly, small isolated cavities of varying size are seen to open by a narrow orifice in the region of the verumontanum. On the other hand, urethrography may reveal giant cavities occupying a large portion of the prostate, or lesions of "radiating" prostatitis characterized by a number of small or large cavities communicating with each other and giving a "tree-like" appearance in this region (Figures XVI, XVII, XVIII, XX).

These evidences of chronic prostatic inflammation are commonly revealed by urethrography. In many cases they provide an explanation for the persistence of chronic bladder infection and the symptoms arising therefrom. The film provides striking ocular evidence of the futility of the more usual methods of treatment for chronic prostatitis, and it becomes obvious that surgical treatment by incision with the electrode knife or by removal of the overlying tissue by perurethral resection to produce adequate drainage must be necessary for a cure.

Miscellaneous Conditions.

Other lesions of the urinary tract may be disclosed in the process of the investigation. Reflux of the cystographic medium along one or both ureters may demonstrate gross back-working in the form of hydronephrosis or hydronephrosis, and the filling defect caused by a large ureterocele has been demonstrated.

SUMMARY.

1. The use of the cysto-urethrogram is suggested as a helpful and essential method of investigation of the lower portion of the urinary tract.
2. The technique of cysto-urethrography is outlined, as are also the difficulties and dangers.
3. The diagnostic appearances in the cysto-urethrogram due to the various pathological conditions of the lower portion of the urinary tract are discussed.

STUDIES IN TUBERCULOSIS.

By REGINALD WEBSTER, M.D., D.Sc., F.R.A.C.P.,
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V. BIOPSY STUDY OF LYMPHATIC GLANDS IN THE DIAGNOSIS OF TUBERCULOUS DISEASE OF JOINTS.¹

A PROCEDURE that holds promise of pointing the exit from the valley of indecision, into which clinicians are often led by children presenting joint affections suggestive of tuberculosis, merits careful examination and judicious application. Too often clinical and radiological signs are

¹ A report to the National Health and Medical Research Council of Australia.

insufficient to establish the diagnosis of tuberculosis in the early stage at which it is imperative that it should be recognized, while the opening of a joint for the purpose of biopsy is a measure not lightly to be undertaken and not always productive of conclusive evidence.

Lymphatic Gland Biopsy in Practice.

The utility of excision of an inguinal lymphatic gland in the diagnosis of tuberculous disease of the knee joint has been demonstrated by H. J. Seddon,¹⁰ who obtained unquestionable evidence of tuberculosis in the lymphatic glands of the inguinal group in no less than 15 out of 18 cases of tuberculosis of the knee joint. Similar results were obtained by José Valls,¹¹ of Buenos Aires, to whom Seddon gives credit for originating the method, although at the time he commenced his own study, the work of Valls was unknown to him. Valls obtained histological or bacteriological evidence of tuberculosis, or both, in 15 out of 17 biopsies of lymphatic glands which might be held to lie in the path of the lymphatic return from joints; his work included the examination of epitrochlear glands for the clarification of diagnosis in suspected tuberculosis of the elbow and wrist joints, as well as the study of inguinal glands of patients whose knee joints presented the diagnostic problems.

The conclusion that tuberculosis of the presumed regional lymphatic glands reflects the same pathological process in a joint affected with arthritis of doubtful nature may not be drawn without careful consideration of the possibility that the tuberculous lymphadenitis may have arisen in some other manner. Tuberculosis of lymphatic glands, so widespread as to justify the use of the term generalized, is within my experience at the Children's Hospital; but I can remember only one example of such condition, and have recently confirmed recollection by a successful search for the child's autopsy record. A more recent instance of tuberculosis affecting several groups of lymphatic glands, axillary and supraclavicular, on both sides, was provided by a child, aged eighteen months, whom Dr. Robert Southby presented at a meeting of the Melbourne Pediatric Society as remarkable for the manner in which he supported extensive intrathoracic tuberculosis. This little boy confounded prognosis by living for a further two years, and in the interval developed tuberculosis of the several groups of lymphatic glands already indicated. Tuberculosis involving multiple groups of lymphatic glands may also occur in association with extensive bony disease; but it is a rare observation. The possibility that a more or less generalized glandular tuberculosis may introduce confusion in lymphatic gland biopsy for diagnosis of tuberculosis in joints is remote, and would arise only if a suspicious joint affection developed in a child in whom widespread glandular tuberculosis was as yet not clinically appreciable.

It is otherwise, however, with certain cutaneous tuberculous lesions which, often inconspicuous, healed, and prone to be overlooked, induce tuberculosis in the inguinal and axillary lymphatic glands. Cutaneous tuberculosis, perhaps mistaken for impetigo, I would regard as the principal source of error in the diagnosis of tuberculosis of joints by biopsy of lymphatic glands; the point is one which I propose to discuss more fully in a later section. Suffice it for the present to urge that tuberculous changes in superficial lymphatic glands may be referable to apparently insignificant tuberculous lesions of the skin, and that careful search should be made for such cutaneous foci or their scars.

Technique.

The routine method which has been followed at the Children's Hospital for the biopsy study of lymphatic glands in suspected tuberculosis of joints requires, at the outset, the prompt dispatch of the excised gland to the laboratory and its protection from the well-meaning offices of those who would place it in formol-saline or other fixing solution. The first step taken in the laboratory is to divide the gland through the hilum in its longer axis; one-half is placed in formol-saline solution with a view to the preparation of sections for histological examination,

and the other half is subjected to cultivation in a manner appropriate to the growth of *Mycobacterium tuberculosis*. Exhaustive histological study demands the preparation of serial microscopic sections; but the time and technical assistance at my disposal have compelled me to adopt four sections, each from a different level in the paraffin block, as a working routine method. In general this plan has proved satisfactory, if such a claim may be based on the fact that for none of the fifteen glands concerning which a negative histological finding was recorded, has it been necessary to issue a revised report by reason of the subsequent appearance of *Mycobacterium tuberculosis* in culture media.

The half of the gland reserved for cultural study is reduced to a pulp by vigorous scarification with a knife blade, and in this condition it is transferred to a suitable screw-capped or rubber-stoppered bottle. The macerated lymphatic tissue is then exposed to the action of 4% soda solution, with the double object of effecting digestion of the mass and of eliminating any contaminating microorganisms which may have been inadvertently introduced in the treatment of the gland. Experience has shown that two or three cubic centimetres of 4% soda solution, aided by incubation and shaking at intervals, effect digestion of the pulped tissue within thirty minutes. Neutralization is the next step, and is followed by centrifugation for the concentration of bacilli; the deposit obtained should serve as inoculum for at least three tubes of culture medium. In the preparation of tissue for the cultivation of *Mycobacterium tuberculosis*, 4% soda solution has the advantage over 6% sulphuric acid solution, in that the digestive action of the alkali facilitates the concentration of bacilli by liberating them from their tissue entanglements, and provides at the end of the process a soft, pulaceous inoculum that is easily rubbed into the surface of the culture medium. That tubercle bacilli, which it is desired to cultivate, should be ensured intimate contact with the medium by thorough rubbing in of the inoculum, as opposed to a merely streaking of it on the medium, is an important point in the cultivation of *Mycobacterium tuberculosis*, and failure to appreciate this point will lead to many disappointments.

It will be seen from the results shortly to be presented that there has been only one deviation from parallelism in the histological and cultural findings relating to lymphatic glands examined for such supporting evidence as they might disclose for the clinical diagnosis of tuberculosis in a neighbouring joint. But it may not always be so, and it is reasonable to anticipate, as observations accumulate, that instances will arise in which cultivation will succeed when examination of the microscopic section will fail, and vice versa. It is the patchy distribution of early tuberculous lesions in lymphatic glands that indicates the advantage to be gained from serial sections in histological work and makes for the possibility of a successful culture of *Mycobacterium tuberculosis* from one fragment of a gland when no tissue reaction suggesting tuberculous infection can be discerned in microscopic sections prepared from another portion. It is conceivable also that viable tubercle bacilli may repose in a gland without inducing any tissue changes, in which event bacteriological methods alone will detect them. Hence the necessity for combining histological and bacteriological measures and for supplementing examination of microscopic sections with cultural methods or guinea-pig inoculation. In the work by which H. J. Seddon¹⁰ demonstrated tuberculosis in the inguinal glands on the affected side in 15 out of 18 subjects of tuberculous disease of the knee joint, a comparison of the results attending histological examination and guinea-pig inoculation is available for nine of the fifteen glands for which a positive finding was recorded. In five instances tuberculosis of the gland was proved by both histological and animal inoculation methods; in two, microscopic sections furnished evidence of tuberculosis which was not forthcoming by guinea-pig inoculation, and in two the reverse situation obtained, the guinea-pig establishing a diagnosis of tuberculosis which was not possible on the evidence afforded by microscopic sections.

Presentation of Results.

The results obtained from the examination of lymphatic glands excised as biopsy measures to establish diagnosis in suspected tuberculous arthritis may be considered on the basis of the joint affected and with reference to the responses of the individual patients to the Mantoux intracutaneous tuberculin test. Of the 25 patients so investigated, 23 were children and two were adults; in 14 the affected joint was the knee joint, in eight the hip joint, in two the ankle joint and in one the wrist joint.

Knee Joint: Patients Who Reacted to the Intracutaneous Tuberculin Test of Mantoux.—In the first group there were eight patients—seven children and one adult—who reacted to the intracutaneous tuberculin test of Mantoux. The biopsy material received consisted of one or two lymphatic glands excised from the superficial inguinal group. Incontestable proof of tuberculosis affecting the glands was adduced in six instances and rested on characteristic tuberculous histological appearances (Figures I and 11) demonstrated in microscopic sections prepared from one-half of the gland, endorsed by the cultivation of *Mycobacterium tuberculosis* (Figure III) from the digested lymphatic tissue of the other half. In the investigation of two children who reacted strongly to the Mantoux test, no support for a diagnosis of tuberculous disease of the knee joint was forthcoming by biopsy study of an inguinal lymphatic gland. One boy, aged nine years, was subsequently subjected to operation for the removal of a "joint mouse", and the pathological condition was thereby determined as *osteochondritis dessicans*. The weight of evidence in the case of the other child, a girl, aged ten years, would appear to indicate tuberculosis of the knee joint as the correct diagnosis, despite the negative findings attending histological and cultural investigation of the excised inguinal gland. The girl's maternal grandfather and a maternal aunt had died of pulmonary tuberculosis, and a cousin suffered from tuberculosis of the spine. As against such a family history, combined with a +++ Mantoux reaction and a joint suggesting tuberculosis in its clinical and radiological features, the failure of biopsy study of an inguinal gland to provide laboratory evidence of tuberculosis cannot be allowed unduly to influence diagnosis. The boy for whom the diagnosis of *osteochondritis dessicans* was established may be eliminated from the assembled results obtained in the group of eight tuberculin reactors exhibiting an affection of the knee joint regarded clinically as tuberculous. In six of the remaining seven instances diagnosis was confirmed by indubitable proof of tuberculosis in the inguinal lymphatic glands. In every instance a report of tuberculous lymphadenitis based on histological evidence was issued within a few days, unprejudiced by the results of cultivation, which were not available for three or four weeks. It may be noted that the "eugonic", human type of *Mycobacterium tuberculosis* was cultivated in all cases (Figure III)—a finding consistent with my experience of the type of tubercle bacillus operating in tuberculosis of bones and joints in this State.

Knee Joint: Patients Who Failed to React to the Intracutaneous Tuberculin Test of Mantoux.—Six children concerning whom clinical suspicion of tuberculosis of the knee joint arose exhibited no reaction to the intradermal injection of 0.1 cubic centimetre of 1:1,000 dilution of old tuberculin. It would have been surprising had any of the inguinal glands excised from the patients in this group furnished evidence of tuberculosis, but no such paradox eventuated. The same routine of histological and cultural examination resulted in findings which were uniformly negative and in striking contrast with the high proportion of positive findings in the group of tuberculin reactors. The pathological process in one of the non-reacting children was ultimately elucidated by the evacuation from the patella of pus and granulation tissue from which the *Staphylococcus aureus* was cultivated. Diagnosis in each of the other five cases remained as nothing more satisfactory than subacute arthritis of doubtful aetiology; but in none did radiological observation or the subsequent clinical course give reason to modify the decision that the affection of the knee joint was non-tuberculous.

Hip Joint.—Inguinal gland biopsy has been performed in eight instances as possibly providing the means of confirmation of suspected tuberculosis of the hip joint. Two of the patients failed to react to the intradermal tuberculin test, and negative results attended both histological and cultural examination of the excised glands. Six children reacted to tuberculin and there was no reasonable doubt that tuberculosis of the hip joint existed in five of them. *Mycobacterium tuberculosis* had been cultivated from other tuberculous foci in three of these children; from the gastric content of one, the wrist joint of another and the urine of a third. No laboratory evidence of tuberculosis could be adduced by the histological and cultural study of the inguinal lymphatic glands of four of the six children who reacted to the Mantoux test. In the other two instances, however, tuberculous lymphadenitis was writ large in microscopic sections and *Mycobacterium tuberculosis* of human type was cultivated from the lymphatic tissue. Whether the tuberculosis of the inguinal glands in these two children was referable to tuberculosis of the neighbouring hip joint or was susceptible of other explanation is a point reserved for discussion at a later stage.

Ankle Joint.—An inguinal gland for biopsy study directed towards the detection of tuberculosis was received from each of two patients in whom the affected joint was the ankle joint. The first, a girl, aged eleven years, gave no reaction to the Mantoux test, and her illness pursued a clinical course which led to an eventual diagnosis of osteomyelitis of the fibula. Negative findings with respect to tuberculosis were obtained by examination of the excised gland. The second patient was a man in the care of Dr. Eric Price, who had arrived at a diagnosis of tuberculosis on clinical and radiological grounds. Confirmation was forthcoming from the demonstration of the tissue reaction characteristic of tuberculosis in sections prepared from one portion of the gland, and the subsequent appearance of *Mycobacterium tuberculosis* in cultures prepared from the remainder. It should be mentioned that tuberculous destruction of the ankle joint of this patient had advanced to a stage which necessitated amputation.

Wrist Joint.—In the case of a boy, aged nine years, the clinical diagnosis of tuberculosis of the left wrist joint was endorsed by the histological picture observed in an excised axillary gland. No success attended the attempt to cultivate *Mycobacterium tuberculosis* from portion of the gland, and this was the only experience in which bacteriological evidence could not be provided in support of the histological report. The clinical notes relating to this boy record the presence of small, shotty glands in the left axilla, and state specifically that the gland chosen for excision was situated deeply in the apex of the axilla.

Comment.—The foregoing observations may be presented in the form of a table (Table I), from which all those patients who failed to react to the Mantoux test are excluded, as are those for whose illness a diagnosis of some other condition than tuberculosis was eventually established.

TABLE I.
Biopsy Study of Lymphatic Glands in Relation to Tuberculous Joints.

Joint Affected.	Number of Instances.	Gland Excised.	Tuberculous Histological Findings.	Cultivation of <i>Mycobacterium tuberculosis</i> .
Knee ..	7	Inguinal.	6	6
Hip ..	6	Inguinal.	2	2
Ankle ..	1	Inguinal.	1	1
Wrist ..	1	Axillary.	1	—
Totals ..	15		10	9

Lymphatic Drainage of Joints.

With one exception, all the glands submitted for biopsy study have been excised from the superficial inguinal group, and the results obtained cannot be properly

interpreted apart from a consideration of the lymphatic drainage of the joints of the lower extremity. Text-books of anatomy describe the lymphatic vessels of the extremities as arranged in superficial and deep systems, but are not very helpful in the specific question of the lymphatic return from joints. It would appear that, while they are not without the means of communication, the superficial and deep systems of lymphatic vessels in the limbs normally function as separate entities. It is also evident from the results of many studies by various workers that in man and in the higher animals the lymphatic vessels of the articular synovial membranes drain mainly into the deep glands. Important data in this connexion have been established by the experimental work of Kuhns,⁽¹⁾ who injected India ink into the tibioastragalar, knee, and hip joints of successive series of rabbits. When the pigment was injected into the tibioastragalar joints of six rabbits, the lymphatic drainage was traced through the so-called deep system to the popliteal and to the external and common iliac glands. The only rabbit of the six to show staining in the inguinal lymphatic glands was an animal which was excluded on account of the extravasation of ink into the subcutaneous tissues—an experimental accident which suggests the manner in which the inguinal glands may become involved in tuberculosis of the knee and ankle joints.

In all of six rabbits subjected by Kuhns to the injection of India ink into the knee joint, staining was subsequently demonstrated in the external and common iliac lymphatic glands; no ink appeared in the popliteal or inguinal glands, but the observation was made that ink reached the popliteal glands if extravasation into the periarticular tissues occurred in the process of injection of the knee joint. In every one of five rabbits in which India ink was injected into the hip joint, microscopic sections of the iliac lymphatic glands showed a liberal deposition of ink, those of the inguinal glands presenting a striking contrast by the total absence of ink staining.

Of particular interest for their bearing upon the importance of biopsy of lymphatic glands in the diagnosis of tuberculous joints are the experiments in which Kuhns injected suspensions of tubercle bacilli into the knee and ankle joints of rabbits. He experienced surprising difficulty in inducing tuberculous infection of the synovial membrane and capsular tissues, but succeeded eventually by making repeated injections of a saline suspension of relatively avirulent human tubercle bacilli. Each of four rabbits was given four injections into the knee joint at intervals of two, four, eight and fourteen days respectively. Microscopic study of the capsules of the joints and of the iliac lymphatic glands of the third and fourth rabbits revealed the presence of inflammatory processes of a tuberculous nature. In the first and second rabbits tubercle bacilli were found in smears prepared from the common iliac glands; but apparently the microorganisms had not as yet induced inflammatory reaction recognizable as tuberculous. It will be noted that the lymphatic glands in which tubercle bacilli and tuberculous processes were observed after the injection of suspensions of tubercle bacilli into the knee joints of rabbits, were the common iliac glands and not the inguinal glands. Kuhns concluded that the repeated injections of tubercle bacilli into the joint cavities of rabbits showed the lymphatic absorption of these bacteria to be the same as that observed for insoluble particulate matter. Undetermined factors played a part which rendered the absorption of tubercle bacilli less readily demonstrable than that of inert particles.

The best known studies of the lymphatic return from human joints are those of Schdanow,⁽²⁾ who traced the lymphatic drainage in cadavers of still-born babies. He determined that the lymph flow from the tarsal joints followed the course of the peroneal and anterior tibial vessels to the popliteal lymphatic glands. The knee and hip joints drain chiefly into the deep femoral and iliac glands, but the popliteal glands participate in the absorption of lymph from the knee joint to the extent that they receive lymph from the posterior and inferior portions of the articular capsule.

In a recently published monograph, Kling⁽³⁾ epitomizes the subject of lymphatic drainage from the joints as follows. In the upper extremity the carpal joints drain to the cubital and cervical lymphatic glands, the elbow joint to the cubital and axillary glands, and the shoulder joint to the axillary, posterior cervical and superficial cervical glands. In the lymphatic system in the lower extremity the glands indicated as regional for the ankle joint are the popliteal and iliac glands, for the knee joint the deep femoral and iliac glands, with the popliteal glands in a minor role, and for the hip joint the deep femoral and iliac glands.

Discussion.

Knee Joint.

Clinical facts determined by biopsy study of inguinal lymphatic glands in the diagnosis of tuberculous disease of the knee joint are in conflict with the conclusion to be drawn from the foregoing anatomical data—namely, that no involvement of superficial lymphatic glands is to be expected in arthritis unless the superficial tissues participate in the infective process. Kling,⁽³⁾ indeed, makes this statement, *an ipse dicit*, which is subject to challenge because of its inescapable implication that tuberculosis affecting the knee joint must reach the advanced stage of extension to the periarticular tissues before it is reflected in the lymphatic glands of the inguinal group. In reporting his observations on the remarkably constant association of tuberculous inguinal lymphadenitis with tuberculosis of the knee joint, Seddon⁽⁴⁾ emphasized the value of inguinal gland biopsy in obviating months of waiting and uncertainty by enabling diagnosis of the joint affection to be made at a time when clinical and radiological signs were minimal, and insufficient for even provisional diagnosis. It may be recalled that Seddon demonstrated tuberculous infection of the inguinal lymphatic glands in 15 out of 18 subjects of tuberculous disease of the knee joint, and that figures obtained independently by Valls were almost identical. Valls's observations, however, were not confined to the inguinal glands and the knee joint, but included biopsy of the epitrochlear gland in relation to tuberculosis affecting the wrist and elbow joints. In this paper I bring forward as supporting determinations the presence of tuberculosis, proved by both histological and bacteriological methods, in the inguinal glands of six out of seven patients, concerning whom clinical and radiological findings were suggestive of tuberculous disease of the knee joint. In the cases of three of these children the duration of symptoms was no longer than three months, and in only one case had the period of disability been as long as twelve months.

Here, then, are certain thoroughly attested clinical facts which cannot be brought into agreement with dogma based on the anatomy of the lymphatic drainage from joints as at present understood. Anatomical considerations would indicate that in tuberculosis of the knee joint tubercle bacilli might be expected to reach the deep femoral and iliac glands, but that they should not appear in the glands of the superficial inguinal group unless and until the subcutaneous tissues are involved. These dicta notwithstanding, biopsy study of inguinal glands of patients affected with tuberculosis of the knee joint shows that tubercle bacilli constantly reach the inguinal glands and there establish themselves long before the disease in the joint can be considered advanced. By far the greater part of present-day knowledge of the lymphatic return from joints and bones has been gathered by tracing to their destination in lymphatic glands (thereby determined as regional) pigment particles such as those of India ink injected into the joint and medullary cavities of rabbits and dogs. Kuhns,⁽¹⁾ as also Key,⁽⁵⁾ studied the distribution in lymphatic glands of carbon particles introduced into the joint spaces of young adult rabbits, and in support of his thesis concerning the lymphogenous metastasis of carcinomata in bones, Kolodny⁽⁶⁾ demonstrated a certain relation between the bone marrow and the lymphatic system by injecting a few drops of India ink or carmine emulsion into the medullary cavity of the bones of dogs.

The appearance of the pigment in the lymphatic glands anticipated for the respective bones was submitted by Kolodny as evidence of a circulation of lymph in the bone marrow; he did not, however, establish the existence of medullary lymphatic vessels, and as pointed out by Willis,¹⁰ carriage of pigment particles from the medulla of bones to adjacent lymphatic glands might well have been effected through the agency of macrophages.

The care and assiduity with which the problem of the lymphatic return from joints and bones has been attacked by workers such as Kuhns, Key and Kolodny, have resulted in findings which seem all sufficient for the laboratory animals concerned; but it does not follow that they tell the whole story for human beings. Job¹¹ has shown that as a rule the larger and more highly developed the animal, the greater its endowment of lymphatic glands, and presumably such glands attain their maximum in number and distribution in man. In dogs and in man there are femoral glands draining the deep lymphatic system, apparently not connected with the inguinal group; deep femoral glands are not to be found in the rabbit.

Probably the difficulty in reconciling the clinically ascertained fact that tubercle bacilli commonly reach the lymphatic glands of the superficial inguinal group from the knee joint with the anatomical teaching that the regional glands for this joint are the deep femoral and iliac glands will be resolved with the bridging of a certain hiatus in anatomical knowledge. In the meantime the following suggestion is offered, more as a working hypothesis than as an explanation founded on any deep conviction. A protracted inflammatory process, such as that of tuberculosis affecting the synovial membrane and articular capsule, might be expected to lead before long to occlusion of the intraarticular lymphatic vessels, at first by fibrin thrombi and later by cicatrization. Kuhns¹² showed experimentally that the induction and maintenance of a mild degree of synovitis, by the injection into the knee joints of rabbits at regular intervals over a period of many weeks of a 20% solution of potassium iodide, resulted in a remarkable diminution in the number of synovial lymphatic vessels as compared with those of untreated joints. Lymphatic absorption from such joints was greatly impaired, and Kuhns was unable to determine that tubercle bacilli had passed to the regional lymphatic glands, even though bacilli were injected on repeated occasions and were demonstrable in smears from the exudate in the joint cavity. On all aspects except the popliteal, the articular capsule of the human knee joint is in close proximity to the subcutaneous tissue and the superficial system of lymphatic vessels; should tuberculous processes determine a sufficient degree of occlusion of the intraarticular lymphatic vessels, patrolling macrophages might elect to convey tubercle bacilli by the conveniently situated superficial lymphatic vessels to the inguinal lymphatic glands.

Hip Joint.

It is questionable whether the indubitable tuberculosis of superficial inguinal glands demonstrated in the cases of two children affected with arthritis of the hip joint (Table I) may properly be interpreted as indicative of tuberculous disease in the joint. Anatomical indications are that tuberculosis of the hip joint reflecting itself in regional lymphatic glands should be found in the deep femoral and iliac glands, and in the case of a deeply situated articulation such as the hip joint it would seem vain to challenge the anatomical position or to attempt to formulate any theory as to the manner in which tubercle bacilli might reach the inguinal glands from a focus of tuberculous disease in the hip joint. Even if anatomical research should prove the existence of communications at present denied between the deep femoral and inguinal lymphatic glands, implication of the superficial glands would be a late event in the course of tuberculous disease of the hip joint.

There is little doubt that tuberculosis of the hip joint was present in one (P.R.) of the two children under discussion; but neither clinical nor radiological evidence

suggested that it had progressed to an advanced stage. The anatomical objection to the association of the biopsy finding on the inguinal gland of this child with tuberculosis of the hip joint is strengthened by the fact that an alternative and more probable explanation of the origin of the tuberculous lymphadenitis can be offered. Within the last two years I have cultivated *Mycobacterium tuberculosis* from pus aspirated from inguinal abscesses in two patients at the Children's Hospital. A lesion which was observed on the skin of the thigh of the first child was regarded as a sore of *impetigo contagiosa* until the demonstration of tubercle bacilli in the pus of the inguinal abscess suggested revision of the diagnosis. Excision of the sore provided the means of demonstrating its tuberculous character by histological sections. In the case of the second child, the cutaneous lesion which underlay the tuberculous inguinal abscess was a sore of indeterminate character on the medio-plantar surface of the great toe. Again, excision of the skin lesion enabled its nature to be established by the examination of microscopic sections, in which tuberculous granulation tissue was seen to be present in the corium. The relevance of two such anecdotes in a discussion regarding the admissibility of tuberculous inguinal adenitis as evidence of tuberculosis of the hip joint lies in the fact that a cutaneous lesion was noted in one of the children (P.R.) concerning whom this question arose. In the case of this little boy, aged four years, clinical and radiological evidence of tuberculosis of the left hip joint was very strong; the child's mother had died of pulmonary tuberculosis and his baby brother of tuberculous meningitis. His clinical notes record the presence of an "impetiginous" sore on the medial aspect of the left thigh and mention enlargement and tenderness of the inguinal lymphatic glands on this side. The cutaneous lesion has since healed; but would it not be more reasonable to regard the demonstration of tuberculosis in the inguinal lymphatic glands as indicating the tuberculous nature of the "impetiginous" sore on the skin of the thigh, than to connect it with tuberculous disease in the hip joint?

The second child (M.B.) who exhibited tuberculosis in an inguinal lymphatic gland, excised as a biopsy measure in the presence of arthritis of the hip joint, was a girl, aged thirteen years, concerning whom more than a shadow of doubt exists as to the nature of the affection of the hip joint. This girl was admitted to the Children's Hospital in April, 1940, having been limping for seven months. She protested that she felt no pain in her hip; some restriction in the movements of rotation and adduction was apparent, but there was no limitation of flexion. Enlarged glands were noted in the groin on the affected side. The radiological report issued by Dr. Colin Macdonald expressed doubt whether any pathological process appreciable by X-ray examination existed in the hip joint. Ten months later Dr. Macdonald was of opinion that there was no radiological evidence of active disease. The problem of the joint affection in this girl would be solved if the tuberculosis of the inguinal lymphatic glands, which manifested itself as a clinically appreciable adenitis and may have itself occasioned the limp, could be read as having been derived from tuberculosis affecting the hip joint. Argument has already been advanced to show that the finding may not be thus interpreted; but in the present instance it is difficult to offer any other suggestion as to the origin of the tuberculous lymphadenitis. In a recent examination of this patient Dr. Stella Altmann could find no scars on the skin of the affected limb; the patient remembered that she had had a "boil" on the thigh a few months before she began to limp, but her mother discounted this as a trivial lesion, which lasted little longer than a week and required no treatment or dressings.

Inoculation Tuberculosis.

At this point I feel the danger of being drawn into a long digression on the subject of tuberculous lymphadenitis arising by metastasis from apparently insignificant cutaneous lesions. Such may present themselves as healed and inconspicuous scars, not infrequently the direct

result of trauma, completely eclipsed by the adenopathy which brings the patient under observation. Without doubt, those who limit their conception of inoculation tuberculosis to the classical *verruca necrogenica* of the post-mortem room and the abattoirs, have occasion to revise and enlarge their ideas. The cases reviewed by Holt,⁽¹⁰⁾ and by Reuben,⁽¹¹⁾ of tuberculosis supervening on ceremonial circumcision, and one that I have reported of a similar sequence of events in non-ritual circumcision,⁽¹²⁾ are no more remarkable than those reported by Carter and Smith,⁽¹³⁾ and by J. H. Stokes,⁽¹⁴⁾ of *tuberculosis cutis* induced by direct inoculation in ways diverse and little to be anticipated. Carter and Smith have placed on record details concerning four cases of proved and three of probable traumatic inoculation tuberculosis of the skin with metastasis to regional lymphatic glands. In six out of seven instances of this condition the initial lesion was completely healed at the time the patients sought treatment for the lymphadenitis. A nail-puncture wound in the web of the hand, a cut on the knee, a laceration of the thenar eminence caused by a broken dish, and an injury to the heel figure as examples of the trauma directly responsible for the *tuberculosis cutis*. In four of Carter and Smith's cases the cutaneous lesion was proved tuberculous by examination of the excised scar tissue. A report by J. H. Stokes describes ten cases of inoculation tuberculosis of the skin with extension to lymphatic glands. This author also emphasizes that the primary lesions, frequently situated in old traumatic scars, are often inconspicuous, and may be far from the site of the metastatic lymphatic glandular tuberculosis. The "apple-jelly" nodule, or tubercle in the cutis and subcutaneous fat, is the essential and distinguishing feature to be sought for by the application of diascopic pressure. In three out of four cases described by Nixon and Short as of "tuberculous chancre", trauma had a part in the origin of the lesion.

It is obvious from a study of the papers of Carter and Smith, Stokes, and Nixon and Short that a delayed adenopathy, developing after even trifling trauma, should lead to examination of the area of skin drained by the glands affected for a possible tuberculous inoculation focus. Perhaps the "boil" mentioned by the girl, M.B., and dismissed as trifling by her mother, was a small tuberculous chancre to which the child's tuberculous inguinal adenitis was referable. At all events, I am not disposed to accept the two positive findings concerning inguinal lymphatic glands excised for diagnostic purposes in suspected tuberculosis of the hip (Table I) as confirmation of the provisional diagnosis. To have demonstrated tuberculosis in an external iliac gland secured for biopsy purposes would have been much more convincing; but opinion at the Children's Hospital seems to regard excision of an external iliac gland as something more than the minor surgical procedure that a biopsy ought to be. H. J. Seddon⁽¹⁵⁾ reports having found tuberculosis in an external iliac gland in support of a clinical diagnosis of tuberculosis of the hip joint, and he quotes H. Osmond Clarke as having had considerable experience of this method of investigation. Seddon is of opinion that the procedure is justifiable, maintaining that an external iliac gland can be removed extraperitoneally through a very small incision.

Conclusion.

It is evident from the observations of Valls and of Seddon, supported by the results presented in this paper, that tuberculous inguinal lymphadenitis is a frequent concomitant of tuberculous disease of the knee joint, and that biopsy examination of lymphatic glands in relation to other joints falling under suspicion of tuberculosis might profitably be instituted. The tuberculous lymphadenitis which it is the object of the examination to disclose is seldom clinically perceptible at the stage in the course of the arthritis when the assistance sought from biopsy excision of a gland is most required. This statement holds at least for the combination in which recorded biopsy studies outnumber all others—namely, the glands of the inguinal group in connexion with suspected tuberculosis of the knee joint. Several of the inguinal glands which enabled me to provide laboratory confirmation for the

clinical diagnosis of tuberculosis of the knee joint were so small that the initial hemisection of the unformalized specimen was a matter of some difficulty. In the present series of observations the only patients in whom inguinal adenitis was clinically evident were the two children considered to be suffering from tuberculosis of the hip joint, and I would submit this feature as supporting the reasons already advanced for attributing the tuberculosis of the inguinal glands in these two children to cutaneous tuberculous foci rather than to tuberculous disease of the hip joint.

The anatomical and pathological problems raised by the findings attending inguinal gland biopsy in tuberculosis of the knee joint are as complex as the procedure itself is simple. If the tubercle bacilli reach the inguinal lymphatic glands and there initiate reactive changes in the course of tuberculosis affecting the synovial membrane and articular capsule of the knee joint, may not other microorganisms, particularly the pyogenic cocci, be expected to do likewise? Yet how seldom, if ever, does suppurative inguinal adenitis complicate the pyarthrosis of the knee joint which is so frequently occasioned by staphylococcal osteomyelitis of the distal extremity of the femur or the head of the tibia?

Summary.

1. After a discussion of the method in practice, and a description of the technique adopted, the results attending a series of observations in biopsy study of lymphatic glands in relation to tuberculous joints are presented.

2. Tuberculous lymphadenitis was demonstrated in the inguinal lymphatic glands of six out of seven patients, all but one of whom were children, suffering from tuberculosis of the knee joint; in glands of the same group in two out of six children suspected of tuberculosis of the hip joint; in an inguinal gland also of one adult patient exhibiting advanced tuberculosis of the ankle joint; in an axillary gland of a child affected with tuberculosis of the wrist joint.

3. Reasons are suggested against the acceptance of the finding of tuberculosis in lymphatic glands of the superficial inguinal group as significant of tuberculous disease of the hip joint.

4. Uniformly negative findings with respect to tuberculosis were obtained concerning lymphatic glands excised in the investigation of arthritis occurring in 15 other patients, in whose cases either no reaction was evoked by the Mantoux test, or a diagnosis other than one of tuberculosis was eventually established.

5. The rule governing so many laboratory procedures, that while a positive finding is of material assistance, a negative result is inconclusive, is to be applied to biopsy study of lymphatic glands instituted to confirm clinical diagnosis of tuberculosis of joints.

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THE TREATMENT OF ESSENTIAL HYPERTENSION.¹

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Definition of Essential Hypertension.

In dealing with the subject of the treatment of essential hypertension it is particularly necessary to have a definition of what is meant by the term "essential hypertension". As we understand it, hypertension means a persistently raised arterial blood pressure, even during rest, and the term essential infers that there is no demonstrable cause. This definition has little meaning, however, without a knowledge of what is the normal blood pressure, and this is somewhat difficult to determine. To take an average of the blood pressures of a large number of apparently healthy subjects would not necessarily give the normal figure, because some of the subjects may be hypertensive and only apparently healthy. On the other hand, any preselection of subjects would obviously invalidate the result of the investigation.

Symonds²⁰ examined over 100,000 healthy applicants for life insurance and gave average systolic blood pressure readings ranging from 123 millimetres of mercury at the age of fifteen years to 135 millimetres at the age of sixty years and over. Fishberg²¹ considers that a systolic pressure above 150 millimetres of mercury is abnormal at any age and that a diastolic pressure of more than 100 millimetres of mercury is probably always abnormal, while one of 95 millimetres is suspicious. On the other hand, Robinson and Brucer²² have studied over 11,000 persons and concluded that the normal systolic blood pressure is from 90 to 120 and the diastolic from 60 to 80 millimetres of mercury.

Allen²³ states that it is unquestionably true that the normal blood pressure of adults does not increase with age and that the old rule that the normal systolic blood pressure is equal to the age of the patient plus 100 is fallacious.

Fishberg,²⁴ speaking on hypertension at the Beth Israel Hospital in Boston about eighteen months ago, drew attention to a certain type of young adult who, at the first examination for life insurance purposes, was found to have somewhat elevated blood pressure—for example, in the region of 145 millimetres of mercury systolic and 95 diastolic—and who at subsequent examinations had definitely lower pressures—for example, 130 millimetres of mercury systolic and 80 diastolic. These persons, he said, were of a hypertensive diathesis and were destined to be hypertensives in later years. Edgar Allen,²⁵ discussing this aspect of the subject, said that he was prepared to go further and to say that they were indeed hypertensives already, for if they were not, the stimulus of clinical examination would not have caused an increase in their systolic blood pressures of even 15 millimetres of mercury. To support these views Hines²⁶ has shown that 70% of patients whose blood pressures are 140 millimetres of mercury systolic and 90 diastolic develop hypertension in twenty years, whereas only 3.6% of those whose pressures are less than 120 millimetres of mercury systolic and 85 diastolic do so in the same period (Table I).

Various arbitrary figures have been fixed by different authorities as to what constitutes the upper limit of normal blood pressure. From the foregoing, however, it would appear that 130 millimetres of mercury systolic and 80

TABLE I.²

Blood Pressure. (Millimetres of Mercury.)		Percentage of Subjects with Hypertension after Twenty Years.
Systolic.	Diastolic.	
140	90	70.0
120	85	3.6

¹ After Hines, 1940.

millimetres diastolic may be taken as normal figures, and that the patients whose pressures exceed 150 millimetres systolic and 100 diastolic may be regarded as hypertensives, while those with intermediate pressures should be regarded as potential hypertensives and worthy of observation.

Treatment of Essential Hypertension.

Having defined what is meant by essential hypertension, I now come to the more important aspect of this discussion. Essential hypertension is one of the commonest conditions met with in the consulting room, and as yet, despite a great deal of experimental work, one of the most unsatisfactory to treat. Yet the importance of treatment may be appreciated by a consideration of the prevalence of hypertension and the frequency with which its complications result in death.

It has been estimated by Barker and Graham²⁷ that approximately 15% of all adults have hypertension and that 23% of patients who are aged more than fifty-three years die of hypertension (Table II). Keith, Wagener and

TABLE II.²

Age Period.	Incidence of Hypertension.	Percentage of Deaths from Hypertension.
All adults	15%	—
Over 53 years	—	23

² After Baker and Graham, 1929.

Barker²⁸ carried out a study in a group of 219 subjects with hypertension whom they classified into four groups according to the severity of their disease. A follow-up showed that 30%, 42%, 78% and 98% of each group respectively had died within four years of diagnosis (Table III). These figures seem high and possibly a preponderance of more severe cases was included. These authors point out that, if the fact is considered that only 9% of their entire series of 219 patients were alive five to nine years after the diagnosis was made, the seriousness of the prognosis is obvious.

TABLE III.²

Group.	Death in Four Years from Diagnosis.
I	30%
II	42%
III	78%
IV	98%

² After Keith, Wagener and Barker.

In another series Blackford, Bowers and Baker²⁹ followed up for from five to eleven and a half years 202 patients with systolic pressures of more than 175 millimetres of mercury and found that half of them had died.

Insurance figures given by May³⁰ show that among those who have a rise in systolic pressure to over 170 millimetres of mercury the relation of actual to expected mortality is roughly 2:1, while among those whose systolic pressures exceed 200 millimetres of mercury the ratio rises steeply to approximately 8:1 (Table IV).

It has been estimated that in the United States of America essential hypertension kills about one-third of a million people annually or 1,000 people per day.

¹ Read at a meeting of the New South Wales Branch of the British Medical Association on November 27, 1941.

ILLUSTRATIONS TO THE ARTICLE BY DR. HENRY MORTENSEN.



FIGURE IV.

Urethro-vascular extravasation of dye behind a long and narrow stricture of the membranous urethra. Note also chronic prostatic abscess.

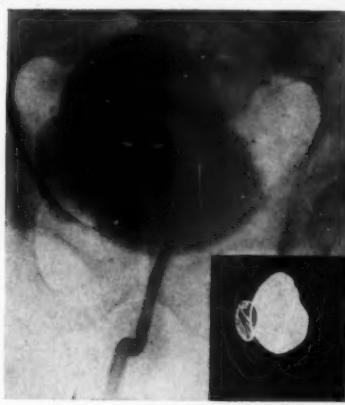


FIGURE V.

Cystogram showing bladder diverticulum.



FIGURE VI.

The same patient as Figure V, after micturition. It will be noted that the film reveals residual urine in the bladder and incomplete emptying of the diverticulum.

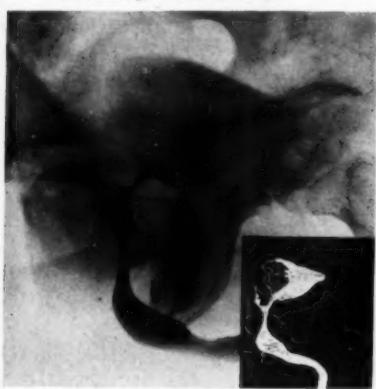


FIGURE VII.

Cysto-urethrogram demonstrating a large filling defect in the region of the base of the bladder due to carcinoma in this region. Cystoscopic diagnosis was impossible owing to encroachment of the growth on the posterior part of the urethra. A false passage was formed in the attempted instrumentation, as seen in the uréthrogram.

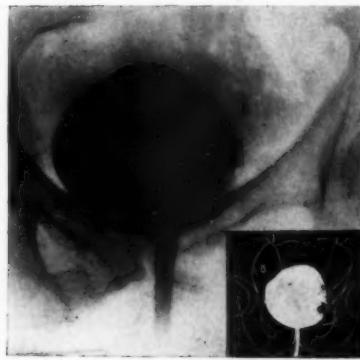


FIGURE VIII.

Cystogram demonstrating filling defect due to papilliferous carcinoma of lateral bladder wall.



FIGURE IX.

Cystogram demonstrating fistulous communication between the bladder and the small intestines.



FIGURE X.

The cystogram in a tabetic bladder demonstrating the typical "Christmas tree" appearance and funnel-shaped vesical outlet.



FIGURE XI.

Cystogram showing elevation of bladder base above the pubes and regular filling defect in the base due to middle lobe enlargement.

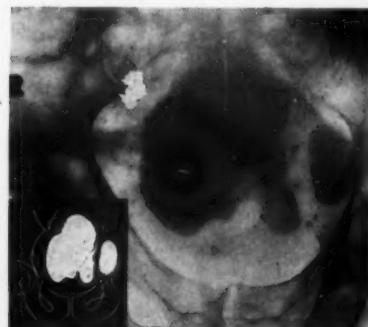


FIGURE XII.

Cystogram: elevation of the bladder base above the pubes due to gross lateral and middle lobe prostatic enlargement. Diverticulum of the bladder.

ILLUSTRATIONS TO THE ARTICLE BY DR. HENRY MORTENSEN.



FIGURE XIII.
Urethro-cystogram demonstrating the bulge forward caused by middle lobe enlargement.



FIGURE XIV.
Cysto-urethrogram: lateral view, obvious elongation and flattening of the posterior portion of the urethra due to enlarged lateral lobes. Filling defect in bladder base due to middle lobe enlargement.

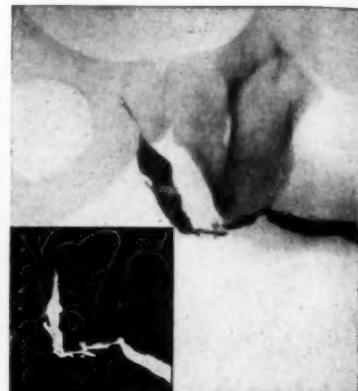


FIGURE XV.
Urethrogram: long, narrow, tortuous stricture of the bulbous urethra requiring excision for its cure.



FIGURE XVI.
Urethrogram: the same case as Figure XV. The patient, in spite of advice to the contrary, had no dilatation over a period of three years subsequent to operation.

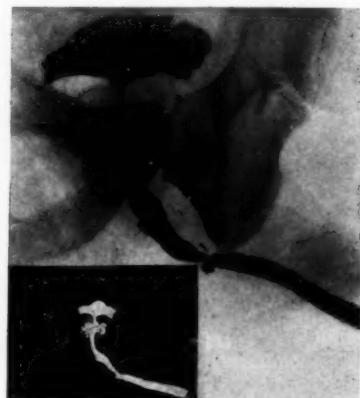


FIGURE XVII.
Urethrogram: stricture of the bulbous urethra, anterior urethritis, chronic abscesses of the prostate.



FIGURE XVIII.
Urethrogram: stricture of the bulbous urethra; false passages in bulb and at bladder neck; chronic prostatitis.



FIGURE XIX.
Urethrogram: long-standing stricture of penile urethra with false passage of unusual length.



FIGURE XX.
Cysto-urethrogram: stricture of bulbous urethra, anterior urethritis, multiple urinary sinuses ("watering-pot perineum"), chronic prostatic abscesses, elevation of bladder base, diverticulum of bladder.

ILLUSTRATIONS TO THE ARTICLE BY DR. REGINALD WEBSTER.

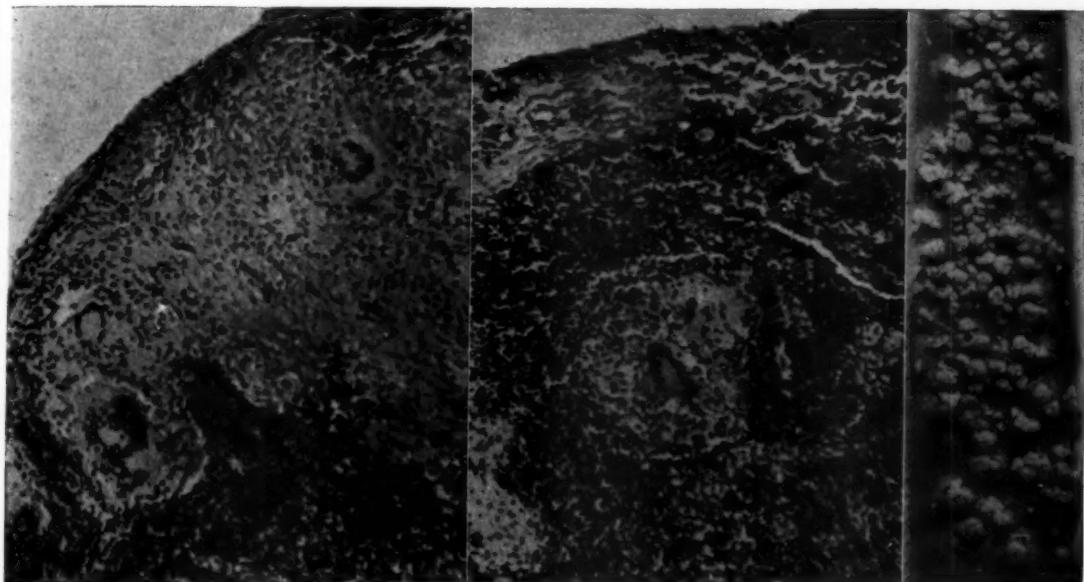


FIGURE I.

FIGURE II.

FIGURE III.

FIGURE I: Confluent tubercle follicles in an inguinal lymphatic gland excised as a biopsy measure in the diagnosis of tuberculous disease of the knee joint. FIGURE II: Inguinal gland biopsy in tuberculosis of the knee joint; single tubercle follicle. FIGURE III: *Mycobacterium tuberculosis* (human) cultivated from the gland that furnished the photomicrographs (Figures I and II).

ILLUSTRATIONS TO THE ARTICLE BY DR. J. HAGA.

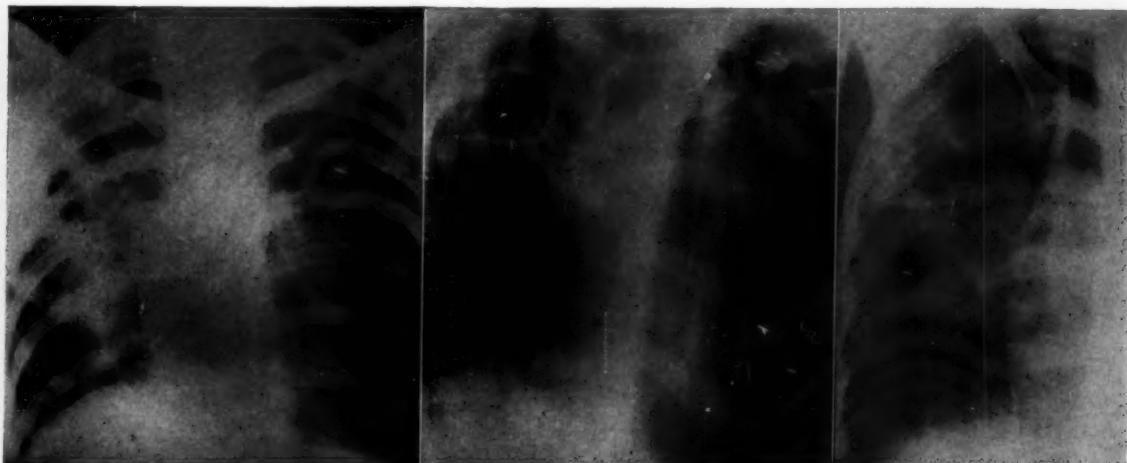


FIGURE I.

FIGURE II.

FIGURE III.

ILLUSTRATIONS TO THE ARTICLE BY DR. R. MACKEY.

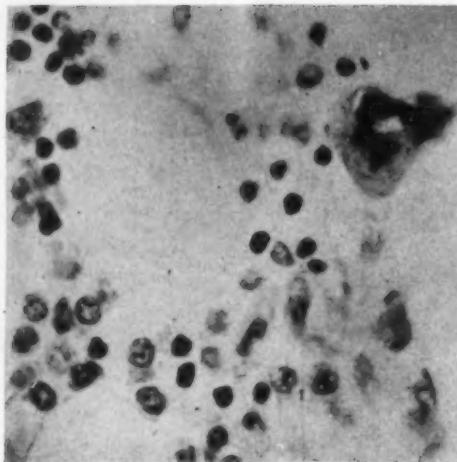


FIGURE I.

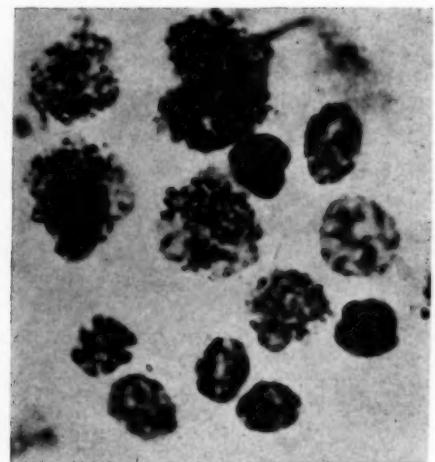


FIGURE II.

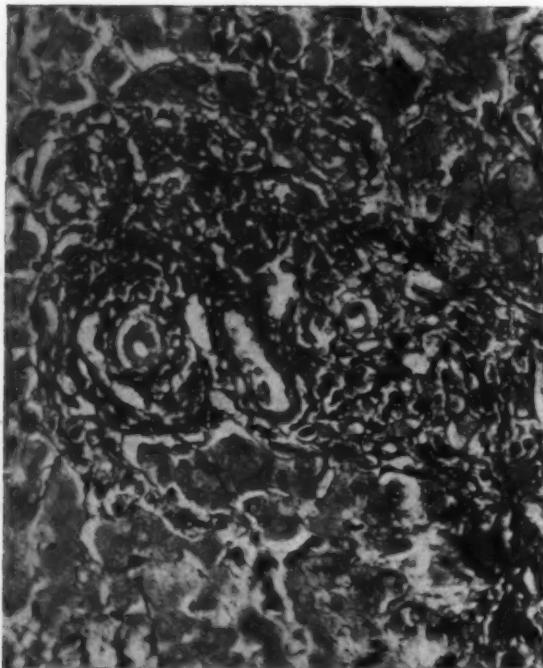


FIGURE III.

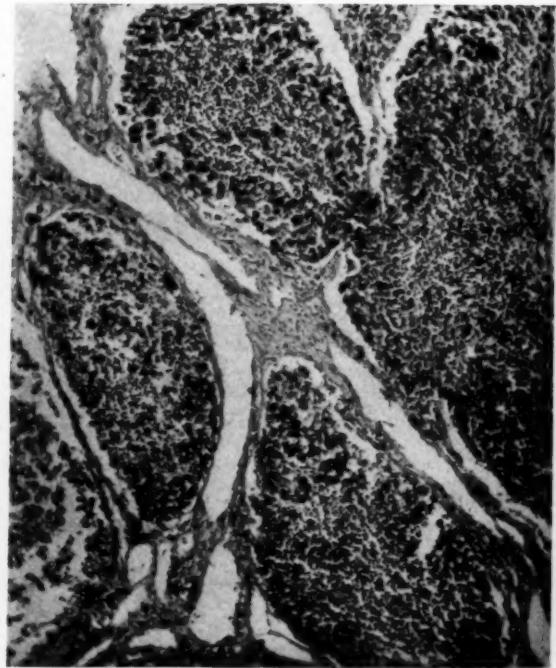


FIGURE IV.

TABLE IV.¹

Systolic Blood Pressure. (Millimetres of Mercury.)	Ratio of	
	Actual Mortality.	to Expected Mortality.
Over 170	219.6	: 100
Over 200	827.5	: 100

¹After May, 1925.

From the foregoing it is obvious, therefore, that there should be no complacency in our attitude towards hypertension. It is a serious disease, and although occasionally sufferers may survive for three or four decades, there is little justification for the belief that at least moderate elevation of the blood pressure does not matter.

There is also a widely held view that the blood pressure is better raised, this condition being of a compensatory nature. This argument, which Goldblatt and his associates¹⁹ describe as teleological, was used by Bell and Pederson,²⁰ who stated that "when there is increased resistance in the renal circulation the blood pressure must be increased in order to maintain the normal blood flow". But, as Goldblatt points out, this does not explain why it should be so nor how the condition is brought about.

Allen and Adson,²¹ who have in many cases of hypertension produced reduction of pressure by surgical means, found that the vital functions continue normally when the blood pressure is reduced, and they doubt whether reduction of blood pressure in itself is ever harmful; on the contrary, they believe such a reduction to be highly desirable.

The modern concept of the production of essential hypertension is that it is due to a progressive obstructive disorder caused by generalized arteriolar constriction, which is initially reversible, but which gradually becomes irreversible because of structural arteriolar changes. If this process cannot be checked, then the disease may be expected to run its course and terminate in one of the usual complications. Thus the desirability of reducing the blood pressure seems obvious, and any therapeutic innovation which gives promise of assisting in this direction should be carefully examined.

The aim of therapy in hypertension is to relieve subjective symptoms and to prevent further elevation of the blood pressure. The methods of treatment at our disposal may be regarded as symptomatic. They deal with the effects rather than with the cause, which remains obscure.

The general medical treatment of hypertension today is much the same as it was twenty-five years ago. The multiplicity of the remedies which have been advocated is evidence of their impotence. Pronounced fluctuations are characteristic of the blood pressure in the earlier stages of hypertension, and many remedies have been acclaimed as specific when actually the reduction in pressure observed during their administration was purely incidental.

When, on examination of a patient, hypertension is found to be present, it is advisable to inform him accordingly. In doing so it is better to use relative terms, such as "slight", "moderate" or "fairly advanced" as the case may be, rather than to state figures. The frequently mentioned phobia of high blood pressure is not often encountered. The use of the sphygmomanometer and the discovery of this prevalent condition have now become a commonplace, and almost everyone knows people who have "blood pressure" and who are seemingly quite well.

It is often stated that asymptomatic hypertension should not be treated. On the other hand, it does not seem advisable that it should be ignored, for here is an opportunity for the practice of preventive medicine. The patient should receive simple advice as to how to regulate his life so as to avoid to some extent those same excesses of work, worry *et cetera*, which are considered to be detrimental to the hypertensive patient with symptoms. Restrictions should not be made severe and too much emphasis is unnecessary.

The treatment of hypertension should include the regulation of work, rest, eating, mental activity, exercise and

relaxation. In hypertensive patients the arterial pressure fluctuates more widely than in normal persons (Weiss²²); the vessels are said to be irritable, and they react excessively to ordinary physiological stimuli.

The mental attitude of the patient is of prime importance. Hypertensives should be reassured and an optimistic attitude on the part of the physician will do much to alleviate the patient's symptoms. "Quack" remedies often bring about the relief of symptoms because the patients are induced to believe that their condition is improving.

Hypertensives often are possessed of considerable nervous energy and drive, which may be either the result of, or a contributing factor to, the hypertension. In any case it should be controlled, and too ambitious impulses are to be curbed. Nine hours per day should be spent in bed and an after-lunch siesta of an hour should be observed if possible. Restful vacations should be taken as often as is practicable, the change of environment being of greater importance than change of climate. For the sedentary patient sudden bursts of exercise are not advisable. Hypertensives should not be week-end athletes; such activity places unaccustomed work upon a heart which already carries an extra burden. On the other hand, regular moderate exercise such as walking is beneficial.

Diet.

As regards diet, there is no necessity to restrict the intake of meat. Experimentally, excessive feeding of meat to animals and man has failed to cause either elevation of blood pressure or any harmful effects upon the kidney. On the contrary, adequate protein in the diet is necessary and this is best supplied in the form of meat. In general, the diet should consist of plain food. It should be restricted in quantity to actual requirements and no allowance should be made for "*luxus*" consumption.

If obesity is present a reducing diet should be prescribed. Increased adiposity means an increased capillary bed, increased work for the heart, and reduction of vital capacity, and it promotes dyspnoea. Too rapid reduction of weight should be avoided, as it may cause faintness and weakness with tachycardia. The optimum rate of reduction varies somewhat with the age and the amount of weight to be lost. Three pounds per week may be taken as the maximal rate of weight loss. It is better not to use thyroid extract unless hypothyroidism is present, because this hormone increases the work of the heart. Weight reduction usually improves the physical capacity very much and especially relieves breathlessness; but only very occasionally does it reduce the blood pressure. Some hypertensives are extremely thin, and indeed there is a tendency for some elderly patients with severe degrees of hypertension to suffer from cachexia with much impairment of appetite.

As regards alcohol, there is no evidence that it plays any part in the causation of hypertension. On general principles, however, only a small allowance is advisable. Tea and coffee should be used only in moderation, because of their tendency to increase nervous irritability and to induce sleeplessness. Restriction of the use of tobacco seems wise in view of its effects upon the heart and circulation. Tobacco can produce a form of angina and it should be interdicted especially in the case of those hypertensives who suffer from angina of effort.

Drugs.

In the past many drugs have been used. Among these mention may be made, for instance, of the iodides and nitrites. The former have no apparent effect on either blood pressure or symptoms and the action of the latter is so transient that they are of little value as hypotensive agents. Moreover, the action of nitrites tends to diminish with use. They are occasionally useful in the relief of headache.

Drugs which give considerable relief in hypertension are the nervous sedatives and the sulphocyanates of potassium and sodium. The sedatives do not appreciably reduce the blood pressure, but they relieve the patient of many of the vague, almost indefinable sensations of discomfort described as "pressure" or "fullness" in the head, dizziness and

inability to concentrate. Also they aid in allaying nervousness, vasomotor instability and flushes, and in promoting sleep. Almost always symptomatic improvement takes place when sedatives are prescribed. The drugs in common use are phenobarbital, bromides and chloral. Of these phenobarbital is the most useful because of its low cost and its convenience to carry, and because it rarely produces undesirable side effects such as skin rashes. It does not seem to lose its action and it may be taken for years without any apparent ill-effects. A useful routine dosage is one one-quarter grain tablet, three times a day after meals. Some patients are better suited by a larger evening dose, say one grain.

If sedatives fail to give relief, recourse may be had to sodium or potassium sulphocyanates. These drugs are capable of reducing arterial pressure. This action has been recognized for nearly forty years; but the drugs have not been widely used on account of their toxic effects. Recently, interest has been renewed in them largely as a result of the work of Barker,⁽¹⁾ who correlated blood cyanate concentration with toxic effects.

Authorities differ widely in opinion as to the effectiveness and safety of the cyanates. Soma Weiss⁽²⁾ found that, while in some patients the arterial pressure had been for a time effectively reduced, in the majority the reduction was accompanied by toxic symptoms and the treatment had to be discontinued. Fishberg⁽³⁾ has seen little, if any, actual benefit to the patient, and in view of the risk of toxic symptoms, has abandoned the use of thiocyanate. Other clinicians, however, make use of the drug. For instance, it is frequently prescribed at the Mayo Clinic. Allen⁽⁴⁾ points out that, at least, it is the most satisfactory drug available today. The advantages derived from the use of cyanate are that the blood pressure is reduced in more than 50% of cases, and all the attendant symptoms of hypertension are relieved. It is most effective in the relief of hypertensive headache and of the characteristic pain which originates in the occiput and neck. Other symptoms, such as tinnitus, while being lessened, may not disappear. The symptomatic improvement is not necessarily proportional to the reduction in pressure, and this reduction is not as a rule great. Usually the systolic pressure falls about 20 to 50 millimetres of mercury and the diastolic pressure about 10 to 20 millimetres. This, however, is sufficient to be effective.

The disadvantages associated with the use of the sulphocyanates are that the margin of safety between adequate and excessive dosage is narrow and that toxic effects may be easily induced. It is said to have a cumulative effect. Moreover, a uniform dosage will produce variable blood concentrations in different patients. Barker⁽¹⁾ has shown that these disadvantages may be largely overcome if the treatment is carefully controlled by frequent estimations of the blood cyanate concentration so long as the drug is being taken. The blood cyanate concentration should be maintained at between 8.0 and 12.0 milligrammes per 100 cubic centimetres. The dosage necessary to maintain this concentration may range from as little as five grains per week to as much as 15 grains per day.

For instance, Mrs. C., aged sixty-seven years, who had albuminuria, a systolic blood pressure of 220 millimetres of mercury and a diastolic pressure of 110 and hypertensive retinal disorder with "exudates", and who suffered from the usual symptoms of hypertension, was taking 11 grains of sodium sulphocyanate per day. Two weeks later her blood pressure was found to have fallen to 180 millimetres of mercury systolic and 90 diastolic. She had lost her nightly and morning headache and felt very well. Her blood cyanate concentration was eight milligrammes per centum. Two weeks later, while still receiving the same dosage, she had no headache, but felt "awful"; she had become weak and tired and had collapsed in the street. The blood pressure was 190 millimetres of mercury systolic and 100 diastolic, but the blood cyanate concentration had risen to 18.2 milligrammes per centum. When finally the dosage was stabilized, she was free from symptoms and feeling very well; her blood pressure was 170 millimetres of mercury systolic and 85 diastolic while she was taking only two grains of cyanate per day. (See Figure I.)

On the other hand, the occasional necessity for high dosage is exemplified by the following case:

Mrs. P., aged fifty-three years, who was suffering from very prolonged attacks of paroxysmal tachycardia and whose blood pressure was 240 millimetres of mercury systolic and 140 diastolic, took 7.5 grains of sulphocyanate per day. After ten days her blood cyanate concentration was 4.4 milligrammes per centum. When a dosage of 15 grains per day was instituted for fourteen days it rose to only 9.0 milligrammes per centum. Finally, she regularly took 11 grains per day, and the blood cyanate level remained between 5.0 and 7.0 milligrammes per centum. As the blood pressure had fallen to 180 millimetres of mercury systolic and 110 diastolic, this was regarded as satisfactory. (See Figure II.)

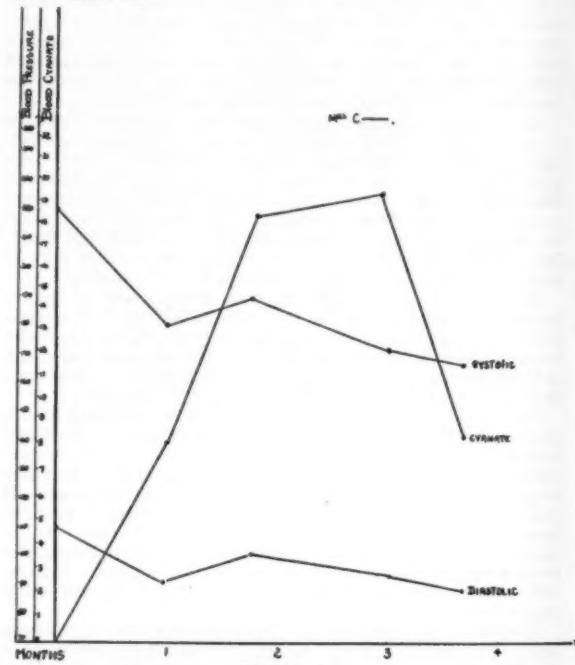


FIGURE I.
Indicating fall of blood pressure and blood cyanate concentration with small cyanate maintenance dosage.

In commencing treatment with cyanate, I usually give 2.5 grains of sodium sulphocyanate three times a day after meals. At the end of a week the blood cyanate content is estimated and further dosage depends upon the result. Frequent blood tests are required at first; but when the blood concentration is stabilized at 8.0 to 12.0 milligrammes per centum, tests need be made only at monthly intervals. Even at these levels, undesirable symptoms of fatigue, weakness, anaemia, increasing nervousness, dermatitis, nausea, vomiting and enlargement of the thyroid gland may occur (Robinson *et alii*⁽⁵⁾). If these optimum levels are exceeded, lethargy, mental confusion, psychosis, difficulty of speech, convulsions, collapse and even death may ensue.

In general, advanced renal and cardiac insufficiency and mental disturbances are contraindications to the use of cyanate, while patients with advanced arteriosclerosis should be treated with special care, as the blood cyanate concentration may rise to toxic levels with relatively small doses.

Despite these disadvantages, there is undoubtedly a place for thiocyanates in the treatment of hypertension, and they should be tried if simple palliation fails. So far, in properly controlled cases, I have encountered only slight toxic effects, such as tiredness and weakness.

A form of treatment sometimes employed for the relief of hypertension is periodical venesection; but in the absence of congestive failure it is rarely of value, as the blood pressure is altered only transiently if at all. Some benefit may be derived from the psychological effect.

Surgical Measures.

The neurosurgical treatment of essential hypertension has been evolved during the last decade; but there is still much disagreement as to its effectiveness, and many claim that its value is not yet established. Those who criticize it adversely state that it is at best only symptomatic treatment, that it is not of value in advanced cases or in those complicated by coronary or cerebral vascular disease, that the results are too often transitory, and that, as yet, there is no proof that the final issue is postponed. They also stress the unpleasant side effects—namely, orthostatic hypotension, tachycardia, vasomotor changes in the lower limbs, interference with ejaculation and probable loss of fertility in the male.

Exponents of the surgical treatment of hypertension, for instance Allen and Adson,⁽¹⁴⁾ on the other hand, state that amelioration of symptoms invariably follows with reduction of blood pressure, that the reduction has been maintained for long periods of time in a considerable proportion of the cases, and that many patients remain symptom-free and able to resume their work, even though their blood pressure returns to the pre-operative levels. These workers, in a large series of over 300 cases treated surgically, claim a considerable reduction of blood pressure in 31% and symptomatic relief in as many more for periods of from three to fifty-five months. With more careful selection of suitable patients they anticipate improvement on these figures. Their present method of making such a selection

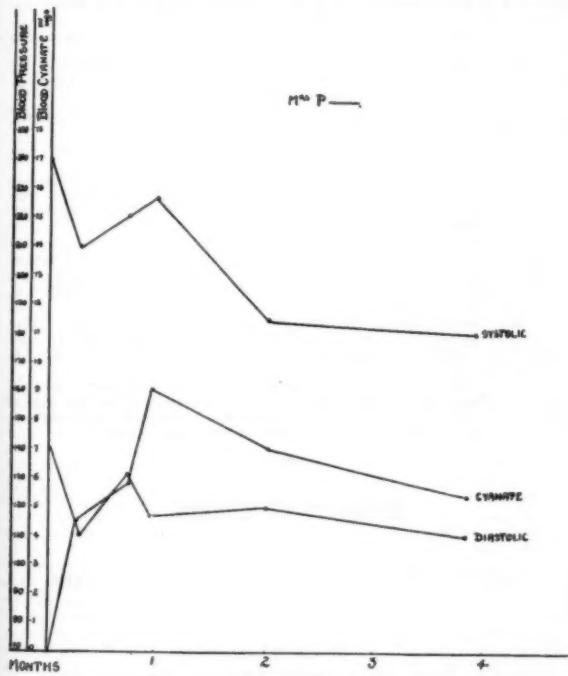


FIGURE II.
Indicating blood pressure and blood cyanate concentration with relatively high dosage.

is to administer three grains of "Sodium amyta" at intervals of one hour for three doses and to have the blood pressure estimated every hour for twenty-four consecutive hours. By means of this sedation the minimal pressure is determined. If the pressure falls to normal or nearly to normal during this experiment, it is considered that the disease is still in its labile stage and that operative treatment may be employed. If the pressure does not fall, or if the fall is inconsiderable, it is assumed that the results of sympathectomy would almost certainly be unsatisfactory. They do not consider that operation is indicated in mild cases, for patients whose condition is satisfactorily

controlled by medical measures, or for patients aged over 50 years, unless other factors are especially favourable. Advanced arterial sclerosis of the retinal arteries, renal insufficiency, cardiac failure and previous coronary or cerebral vascular accidents they consider to be contraindications. Their operative mortality rate has been nil.

It is held, too, that sympathectomy sometimes renders responsive to sulphocyanate therapy patients who were previously resistant. This is substantiated by the recent contribution of Davis and Barker,⁽¹⁵⁾ who in animal experiments found that the effects of intravenous injection of potassium sulphocyanate were increased by the removal of the thoracic sympathetic trunk and splanchnic nerves.

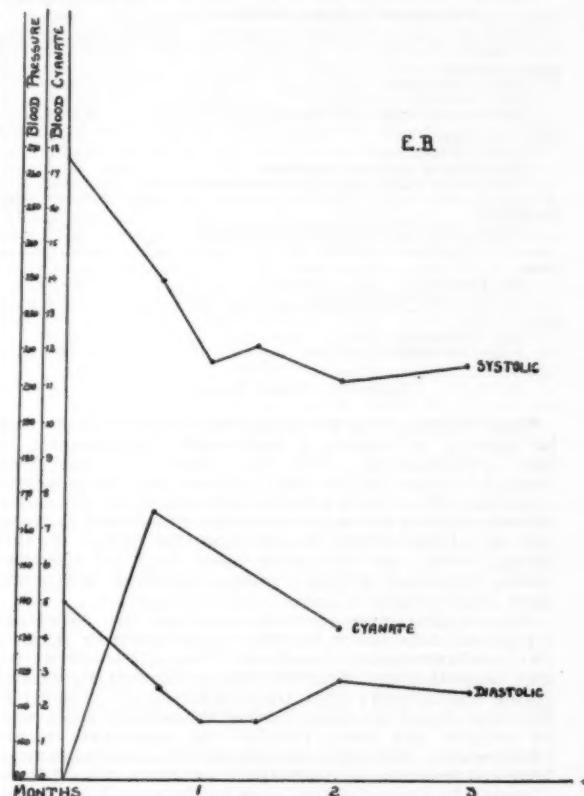


FIGURE III.
Indicating satisfactory control of blood pressure with sodium sulphocyanate.

Peet and his co-workers⁽¹⁶⁾ have recently published the results of sympathectomy in a series of 350 cases, 99% of the patients having been followed up for periods of from nine months to seven years. This series included a preponderance of more serious cases, as was shown by the fact that the average blood pressure was 218 millimetres of mercury systolic and 133 diastolic, and that 77% of patients had diastolic pressures above 125 millimetres of mercury, 27% had papilloedema and 39% were completely incapacitated. The operative mortality rate was 3.4%. The selection of patients for operation depended upon the following criteria. Cardiac decompensation was regarded as a contraindication and renal function had to be adequate; that is, the urea clearance was required to be more than 40% of normal, the blood nitrogen content less than 45 milligrammes per centum, and the urine concentrated to a specific gravity of more than 1,012 on restricted fluid intake. Patients aged over fifty years were for the most part excluded, and those with systolic pressures of less than 200 millimetres of mercury were not operated

upon unless their symptoms were severe and uncontrolled by more conservative treatment. Post-operative "check-ups" showed that in 51.4% of cases the pressure was significantly reduced—that is, the systolic pressure by more than 40 millimetres of mercury and the diastolic by more than 15. Symptomatic relief was given in 86%. Considerable regression of hypertensive retinal disturbance was noted, renal function was improved and the size of the heart was diminished in a high proportion of cases (see Table V).

TABLE V.
Results of Splanchnicectomy.

Improvement in Clinical Condition.	Percentage of Cases.
Blood pressure:	
Reduced to normal	11.7
Much reduced (not to normal)	7.6
Total cases in which significant reduction occurred	51.4
General disability:	
Symptoms relieved	86.6
Incapacitation completely abolished	55.5
Total cases in which incapacitation was much reduced	81.3
Eyesounds:	
Disappearance of papilledema (when present)	73.8
Total cases in which improvement occurred	69.4
Heart:	
Size diminished	64.0
Electrocardiogram improved	53.4
Renal function:	
Urea clearance improved	52.2
Urine concentration improved	44.8

¹ After Peet, Woods, Braden, 1940.

These results are so promising that sympathectomy may be expected to produce a considerable postponement of fatal complications. That this expectation has been realized is shown by the fact that Peet and his associates state that 50% of their patients were alive after five years, whereas only 9% of the patients treated medically by Keith and his associates¹⁰ had survived for that period. In this series, during the five years, apart from 12 operative deaths, 77 patients died as a result of cerebral, cardiac and renal complications in roughly equal proportion.

The surgical procedures in use are the following: (i) adrenal denervation by celiac ganglionectomy (Crile); (ii) subdiaphragmatic resection of the splanchnic nerves with removal of the upper two lumbar sympathetic ganglia (Craig and Adson); (iii) transdiaphragmatic removal of the lower dorsal and upper lumbar sympathetic chain with its ganglia and rami forming the splanchnic nerves (Smithwick); and (iv) supradiaphragmatic splanchnicectomy and lower dorsal sympathetic ganglionectomy (Peet).

It may be concluded that when the disability is serious, when other methods of treatment have failed and when the above-mentioned requirements relative to vital functions and age are fulfilled, surgical treatment may be adopted, as it offers at least a two-to-one chance of continued relief.

The Use of Antipressor Substance.

Recently the effects of administration of an antipressor substance of renal origin have been observed in hypertensive animals and in a small number of patients by Grollman, Williams and Harrison.¹¹ This work was carried out on the hypothesis that normal kidney tissue elaborates a substance which is antagonistic to the action of the renin-angiotensin system. In most of the subjects a fall in blood pressure occurred. The use of this substance, however, is still in the experimental stage, and it is premature to draw conclusions.

Conclusion.

In conclusion, it may be observed that satisfactory treatment for essential hypertension is far from attainment, but that, by the employment of those measures which are at hand, many sufferers will be enabled to carry on in relative comfort, if not in safety.

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Reports of Cases.

LIVER ABSCESS PERFORATING INTO THE RIGHT LUNG.

By J. Haga,
Major, First Netherlands Military Hospital Ship
Oranje.

Clinical Record.

THE patient, T.R., a private soldier from New Zealand, aged thirty-five years, was admitted to hospital under my care with the diagnosis of lung abscess, the sequel of pneumonia and pleurisy after a very severe attack of bacillary dysentery (Shiga). According to his record, the patient had had an attack of Shiga dysentery (proved by bacteriological examination on May 24, 1941). The infection was severe, and the patient was treated with injections of antidyseptery serum and with sulphamamide, and he also received two blood transfusions. Three weeks later, during his convalescence from the dysentery, dyspnoea suddenly developed, pneumonia with pleurisy was diagnosed, and "M & B 693" was administered. A week later he suddenly

coughed up nine ounces (250 cubic centimetres) of thick, purulent sputum, and postural treatment was instituted. The amount of sputum diminished gradually, till on July 27 it was five ounces in twenty-four hours; thereafter it decreased to approximately one ounce per day. Examination of the sputum revealed no tubercle bacilli. Examinations of the stools for amoebae and cysts gave negative results.

On his admission to the hospital ship the patient was extremely emaciated and exhausted, presenting the picture of severe cachexia; he was hollow-eyed, apathetic and listless, and in fact had the appearance of a skeleton. His skin was dry and toneless and his face was ashen in colour. Examination of the mouth showed that the tongue was moist, clean and red, presenting a smooth-polished appearance. Teeth were absent from the upper jaw, a denture being worn. The molar teeth were missing from the lower jaw. The thorax was long, flattened and narrow. Respiratory movements were greatly diminished, the intercostal spaces on both sides being drawn in, except over an area on the right side from the sixth to the eleventh intercostal space, where a pronounced bulging of the chest wall was evident. During respiration the left side of the chest moved freely, but movement on the right side was much restricted.

At the back on the right side, at the level of the third to sixth thoracic vertebrae, the percussion note was slightly impaired, slight dulness being present; from the sixth thoracic vertebra towards the base of the lung the dulness was more pronounced, whereas at the left side towards the lung base the percussion note was slightly hyperresonant. At the front the percussion note over the right suprasternal and infraclavicular regions and the first intercostal space laterally was somewhat impaired and dull compared with the left side. The area over the middle lobe of the right lung was slightly dull. Auscultation at the back on the right side showed that the breath sounds were diminished over the dull areas; no adventitious sounds were heard, and vocal resonance was diminished. At the front diminished breathing was detected over the upper lobe of the right lung and over the middle lobe from the mid-clavicular line to the axillary line. The heart was not enlarged. The pulse rate was 120 per minute and the pulse was regular. The heart sounds were clear but soft. The abdomen was of scaphoid appearance; it moved freely on respiration and could be palpated without discomfort to the patient, except on deep pressure below the costal margin on the lower border of the liver, which could be felt on deep inspiration immediately below the right costal margin and was tender on pressure. An area extending from the sixth to the twelfth rib and limited by the anterior and mid-axillary line, corresponding with the pronounced bulging of the chest wall referred to earlier, was exquisitely tender on pressure over the intercostal spaces. The tendo Achillis and patellar reflexes could not be elicited.

On August 10 the reaction of a twenty-four hour specimen of urine preserved with thymol crystals was acid; it contained a trace of albumin, but no sugar. Microscopic examination revealed occasional pus cells, but no red blood cells were seen; a large number of calcium oxalate crystals and a few uric acid crystals and some mucus were present. The sputum was thick, tenacious and of a greyish-green light brown colour, interspersed with the areas of a light chocolate colour that are characteristic of the pus from a liver abscess of amoebic origin. A microscopic examination was made on August 9, and no tubercle bacilli were found; on August 11 no tubercle bacilli were found, but many leucocytes were present; no Charcot-Leyden's crystals were seen and some elastic fibres were present. An examination of the patient's blood, taken from him while he was in the fasting state at 7.20 a.m. on August 15, gave the following results: the erythrocytes numbered 3,060,000 and the leucocytes 13,200 per cubic millimetre; the haemoglobin value was 70% (Leitz) and the colour index 1.15; of the leucocytes, 2% were eosinophile cells, 55% were lymphocytes, 1% were monocytes and 42% were polymorphonuclear cells, and no basophile cells were seen. Examination of a thick blood smear revealed no malaria parasites. The sedimentation rate was 109 millimetres after the first hour, 126 millimetres after the second hour and 137 millimetres after twenty-four hours.

An X-ray examination on August 15 revealed that the thorax was symmetrical and both parts of the diaphragm were well curved; the right side was four centimetres higher than the left side. The heart was displaced to the right. The left hilus was thickened, and fibrous strands appeared to radiate from the hilus towards the base of the left lung. The upper lobe of the right lung was mottled in appearance and thickened. At the level of the second intercostal space was a round clearer area of a diameter of three or four centimetres. The lower interlobar space of the right lung presented the appearance of thickened fibrous tissue, and

the dense perihilar region was connected by fibrous strands with the medial part of the right side of the diaphragm.

The following points were noted:

1. The sputum had an absolutely inoffensive odour, and its appearance closely resembled that found in cases of liver abscess perforating into the lung. It is well known that the odour of the sputum from an ordinary lung abscess is extremely offensive.

2. The local tenderness and bulging over the area extending from the right sixth to eleventh intercostal space, together with the extreme tenderness over the lower border of the liver, suggested hepatitis, similar to that encountered in cases of infection of the liver by the *Entamaba histolytica*.

3. The elevation of the diaphragm on the right side, shown in the X-ray photograph of August 15 (Figure 1), was significant.

Careful consideration of the clinical signs, laboratory examination results and X-ray findings made me come to the conclusion that the cause of the patient's illness was infection with the *Entamaba histolytica*, although no amoebae or cysts could be found in the stools examined. Having decided that the patient was suffering from an amoebic abscess of the liver perforating into the lung, I began treatment with emetine on August 16. My usual practice in ordinary cases of this kind is to start with five subcutaneous injections of 60 milligrammes of emetine hydrochloride given at intervals of one day, and to repeat the same dosage after an interval of five days. Treatment is then suspended for one month and repeated. In dealing with a case in which amoebae or cysts have been demonstrated in the stools, my custom is to give by mouth "Yatren" (*purisatum*, number 106), one grammme in powder form three times a day for fourteen successive days, the patient being kept on a protein-free diet meanwhile and confined to his bed. It should be noted, however, that some patients do not tolerate "Yatren" well and develop diarrhoea, sometimes having eight to twenty bowel motions a day. In these cases tincture of opium should be given, from five to twenty minims two or three times a day, according to the severity of the diarrhoea, the aim being to reduce the number of motions to not more than three or four a day. In this case, however, owing to the patient's extremely weak condition, my usual treatment was modified, and 45 milligrammes of emetine hydrochloride were given by subcutaneous injection for six consecutive days; the first injection was given on August 16, the sixth on August 21, and the site of the injections was varied to avoid discomfort to the patient as far as possible; the left arm, right arm, right leg, left leg, left arm and right arm were used. In addition, to counterbalance the toxic effect of emetine on the heart muscle, 20 minims of "Digisol" in water were given by mouth three times a day from August 17. To complete the treatment the patient received two tablets each of vitamin B and vitamin C three times a day from August 15 till his disembarkation on August 31. A lateral X-ray photograph was taken on August 17, at the suggestion of Lieutenant-Colonel Douglas Galbraith, commanding officer of the Australian Liaison Staff, to see whether the cavity was free from the mediastinum. This proved to be the case.

The favourable effect of the treatment was soon evident: two days after the last (sixth) injection, on August 23, the right side of the chest was no longer tender on pressure, and the bulging of the intercostal spaces was no longer conspicuous; the patient lost his livid colour, and from being quite listless and apathetic took an interest in his surroundings, looked well, was obviously gaining in weight; he said that he was feeling "100% better", to use his own words.

On August 25 a second blood examination, made on blood taken at 7.15 a.m., the patient being in the fasting state, gave the following information: the erythrocytes numbered 3,792,000 and the leucocytes 17,000 per cubic millimetre, the haemoglobin value was 76% (Leitz) and the colour index was 1.0; of the leucocytes, 2% were eosinophile cells, 34% were lymphocytes, 5.5% were monocytes, 54% were polymorphonuclear cells, 4.5% were rods, and no basophilia was present. Slight anisocytosis was present, and no malaria parasites were seen in a thick blood smear. The increase in the number of the leucocytes, which may have caused alarm, was hailed by me in this special case as a favourable omen, as it seemed to me to indicate that the bone marrow had regained its strength and faculty to react more normally to intoxicating and infective agents.

The amount of sputum lessened gradually, from approximately 30 to 10 cubic centimetres per day. Sometimes it was streaked with blood and sometimes some blood clots appeared; but generally it had the same greyish-green chocolate colour. On August 30 the amount of sputum in twenty-four hours was 20 cubic centimetres, which was nearly twice the amount for the two previous days.

X-ray photographs taken on August 25 showed that the cavity had shrunk to nearly half its size. A great improvement in the condition of the rest of the right lung was evident, and the thickening of the right interlobar space was less obvious. (An examination of Figures I, II and III will show the various changes.) I decided to prolong the interval between the two courses of emetine injections from five to eight days, in order to give the patient longer time to recover from the effects of the emetine drug, although he stood the first treatment very well in spite of his emaciated condition. It was intended that the second course should consist of five injections of the normal full dosage of 60 milligrammes of emetine hydrochloride (instead of the previous dosage of six injections of 45 milligrammes). The first and second injections of this course were administered on August 30 and 31.

Having reached his home port, the patient disembarked on August 31, to continue treatment ashore. On the last five days before his disembarkation he was allowed to spend some hours each day on deck in a recumbent position; this gave him much pleasure, since he had been confined to his bed for three months.

Discussion.

It is hoped that it may be possible to report the final result of treatment at a later date. My only reason for reporting this case now is that it may be helpful to my colleagues in a country where amoebic dysentery is fortunately uncommon.

Acknowledgement.

I am indebted to Colonel J. C. Gerard, commanding officer of the First Netherlands Military Hospital Ship *Oranje*, for permission to publish this case.

AN UNUSUAL CASE OF APLASTIC ANAEMIA WITH ORGAN CHANGES RESEMBLING HÆMOCHROMATOSIS.

By R. MACKENZIE, M.B., B.S.,

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It is well recognized that in true and complete aplastic anaemia all precursor cells, megaloblasts, myeloblasts and megakaryocytes are affected by the aplasia.¹³ Janet Vaughan¹⁴ states that all chronic aplastic anaemias are associated with a pronounced leucopenia and thrombocytopenia; but Lescher and Hubble¹⁵ have reviewed three cases and Kark and Mills¹⁶ have reported two cases in which the number of red cells was greatly diminished although the platelets and white cells were within normal limits. In the last-mentioned cases the clinical picture corresponds to that described by Rosenthal¹⁷ as aplastic anaemia without thrombocytopenia; Rosenthal mentions a case reported by Kaznelson.¹⁸

The cause of the aplastic process has been diligently sought. After the exclusion of known causes, such as benzol, radium, X rays, arsenobenzol¹⁹ et cetera, the disease has been described as a complete clinical entity¹⁸ and a disease *sui generis*: a development from a primitive and congenitally insufficient marrow;²⁰ a hormonal dysfunction²¹ and a late stage of leucæmia. Aplasia has occurred as a result of rickets, chronic arthritis, malaria and typhoid fever;²² senility, nephritis, influenza, chronic infections and hypothyreoidism have been suggested as causal factors.²³ The occurrence of haemosiderin deposits in the liver has been generally observed, and Kark²⁴ reports a case of red cell aplasia in which the patient, after 290 blood transfusions in nine years, developed clinical hæmochromatosis.

Clinical Record.

The patient was a labourer, aged forty-six years. In March, 1936, he complained of pain in the left side of the chest on exercise, generalized weakness and giddiness, and palpitation after exertion. He had been pale for several years and had fainted several times in the previous six months. He had suffered from typhoid fever at the age of five years, from gonorrhœa at the age of twenty-four years, and from *pyorrhaea alveolaris*, for which his teeth were extracted two months prior to his admission to hospital. There was no history of exposure to lead or any other chemical hazard, of drug addiction or of undue consumption of alcohol or tobacco. He was admitted to the Royal Prince Alfred Hospital in December, 1936, and he

presented all the clinical signs of a severe degree of anaemia. A blood count gave the following information: the erythrocytes numbered 1,050,000 per cubic millimetre, the haemoglobin value was 22% and the colour index was 1.08; the leucocytes numbered 4,100 per cubic millimetre, 68% being neutrophile cells, 21% lymphocytes, 7% monocytes, 3% eosinophile cells and 1% basophile cells.

The Wassermann test and the Kline precipitation tests for syphilis failed to produce reactions. A barium meal examination revealed no pathological lesions in the stomach or duodenum; an X-ray examination of the long bones revealed no abnormality. The basal metabolic rate was +1%; routine clinical, biochemical and bacteriological examinations of the urine and faeces revealed no abnormalities. The patient failed to respond to liver and iron therapy, and consequently blood transfusion was relied on to increase the number of red cells and the haemoglobin value; the transfusions were given to him every four or five weeks as an out-patient.¹ In three and a half years from the time of his first admission to hospital he received 39.8 litres of blood in 39 known transfusions. Before trans-



fusion the number of erythrocytes was usually between 1,100,000 and 2,700,000 per cubic millimetre, and the colour index approximately 0.9. The mean corpuscular volume varied from 76 to 84 cubic microns, the mean corpuscular haemoglobin content between 29 and 30 micromicrogrammes, and the mean corpuscular haemoglobin concentration from 35% to 38%. A sternal puncture during this period gave the following information concerning the cells: 2% were myeloblasts, 2.5% premelocytes, 9.5% neutrophile myelocytes, 4.5% neutrophile young forms, 19.5% neutrophile band forms, 15.5% neutrophile segmented forms, 3% eosinophile cells, 0.5% basophile cells, 35% lymphocytes, 6.5% monocytes, 0.5% plasma cells, and 1.0% polychromatic cells; no normoblasts were seen. A normoblast was occasionally seen in the peripheral blood immediately after a transfusion.

At no time was there any serious decrease in the number of leucocytes in the peripheral blood; the count varied from 3,000 to 5,000 per cubic millimetre, with normal percentages of all types. The number of platelets varied from 230,000 to 350,000 per cubic millimetre.

On one occasion in October, 1938, the patient felt so well that he presented himself as a donor. The blood count on this occasion gave the following information: the erythrocytes numbered 4,690,000 per cubic millimetre, the haemoglobin value was 91% and the colour index was 0.9; the hematocrit reading was 35%; the mean corpuscular

¹ There is evidence that several blood transfusions were not recorded.

volume was 76 cubic microns, the mean corpuscular haemoglobin content 29 micromicrogrammes and the mean corpuscular haemoglobin concentration 38%. This count was made one month after a blood transfusion; but the activity of the bone marrow was short lived, as the number of red cells and the haemoglobin value gradually decreased, so that the patient required a transfusion six weeks later. In June, 1940, he was admitted to hospital with a count of 910,000 erythrocytes per cubic millimetre and a haemoglobin value of 20%. The leucocytes numbered 8,030 per cubic millimetre; 68% were neutrophile cells, 20% were lymphocytes, and 12% were monocytes. His general condition was very poor; blood transfusion was attempted, but he died before it was completed.

Post-Mortem Findings.

Bone Marrow.

The sternal bone marrow was increased in amount and deep brown in colour (Figures I and II). The proximal half of the right femur contained many areas of reddish-grey marrow, which were patchily distributed and did not extend into the distal half of the shaft. Microscopically, immature leucocytes were plentiful; myeloblasts, myelocytes and immature and mature polymorphonuclear cells were seen. Eosinophile cells were numerous and there was an increase in the number of lymphocytes. Nucleated red cells were very difficult to find. Megakaryocytes appeared of normal distribution.

Liver.

The liver weighed 2,400 grammes; the surface was finely granular and brownish-red in colour (Figure III). The macroscopic appearances were such as are seen in haemochromatosis, and this was confirmed microscopically. Periportal fibrosis was present, and free iron was demonstrated in the reticulo-endothelial and parenchymal cells. Blocks of tissue gave an intense Prussian blue reaction, and an estimation revealed 12 milligrammes of iron per gramme of liver, or 28.8 grammes in the whole liver.

Spleen.

The spleen weighed 450 grammes; the cut surface was brick red in colour, and blocks gave a positive Prussian blue reaction. Microscopically the architecture of the spleen was preserved; there was an increased amount of connective tissue in the pulp, which contained many iron-laden histiocytes.

Lymph Nodes.

The upper abdominal group of lymph nodes in relation to the pancreas and coeliac axis was brownish-red in colour, slightly enlarged and edematous (Figure IV). The nodes gave a positive Prussian blue reaction. Microscopically the peripheral sinuses were packed with reticulo-endothelial cells laden with iron pigment.

Pancreas.

The pancreas was reddish-brown in colour and very edematous. The blocks of tissue gave a positive Prussian blue reaction. Microscopically, widespread necrotic changes were present and many pigment-laden histiocytes were seen. These latter gave a positive reaction for free iron.

Heart.

The weight of the heart was 450 grammes; the left ventricle was slightly hypertrophied and the muscle appeared browner than usual. Examination of sections revealed the presence of iron pigment within the muscle fibres of the left ventricle.

Lungs.

Both lungs were very edematous, and early bronchopneumonic changes were present at the base of the left lung.

Other Organs.

No abnormal or relevant features were detected in the other organs.

Comment.

The case presented many unusual and interesting features. 1. The final diagnosis was chronic aplastic anaemia, in which the main brunt of the aplastic process was borne by the erythrocytes, a fact which was proved by repeated examinations of the blood, by sternal puncture and by examination of sections of the bone marrow *post mortem*. The leucocytes and platelets were relatively unaffected. Terminally a leucocytosis developed in response to an incipient bronchopneumonia.

2. Both macroscopic and microscopic appearances in the liver, lymph nodes, pancreas and spleen could not be differentiated from the appearances of haemochromatosis affecting these organs. The weight of iron present in the liver was 28.8 grammes, which can be compared with the amount given by blood transfusion (as haemoglobin), namely, approximately 20 grammes. It is suggested that, as the iron given by blood transfusion could not be utilized in the manufacture of erythrocytes, it was stored in the liver, spleen, pancreas, lymph nodes, and to a less degree in other organs, for example the heart, with the production of appearances similar to those of haemochromatosis.

3. The disease showed a natural remission. The erythrocyte count was approximately normal at a time when it should have been in the vicinity of one or two millions per cubic millimetre.

4. The patient was kept alive for three years and seven months by repeated blood transfusions.

Summary.

1. A case of chronic aplastic anaemia of the red cells is presented.

2. *Post mortem*, the appearances in various organs were identical with those seen in haemochromatosis.

3. A natural remission in the course of the disease was noted.

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Reviews.

THE MISSING LINK IN DEMOCRACY.

IN 1933 Dr. Frank Trinca published "Science and Democracy". He restates the former hypothesis and advances a further step in its evolution by writing "The Missing Link in Democracy".

Nine years ago civilization was in the throes of an economic crisis. Dr. Trinca, with commendable foresight, not merely anticipated the fateful clash which was to eventuate in the present war, but endeavoured to analyse the factors leading to periodic cyclic booms and depressions, which are the precursors to armed conflict. The Trinca hypothesis is that invention and industry push forward, lose their impetus, and end in a state of stagnation. The slump is the sequel. Within recent years there have been three major upsurges, those due to the discovery of steam, electricity and internal combustion power. In view of the many thousands of other inventions, it seems unlikely that this cycle theory is entirely valid. The author himself pleads for the investigation of other factors.

¹ "The Missing Link in Democracy", by F. Trinca; 1941. Melbourne: J. T. Picken and Sons. Royal 8vo, pp. 104, with diagrams.

The problem to be solved in its widest sense is how to give sufficient useful occupation to prevent deterioration of mind and body—how to reduce working hours—how to fill hours of leisure with wider scope for betterment of the individual and the herd—how to supply the needy without initiating the evils born of parasitism—how to maintain the elements of competition and responsibility as an essential spur to development of efficiency—and finally, how to keep democratic government in the hands of the intellectually trained, even if their working plan has for the time been thrown into confusion by ignorance of previous uncharted laws of science and the machine, which are the basis of economic and social dynamics.

He points out that looking backward on the great American depression there were infallible signs of the approaching calamity. The drop in railway transportation figures would in themselves have given the clue. Had there been early planning, the drastic measures of stirrup pump finance would not have been necessary. Is it not true that:

Many of the paradoxes of life arise from the fact that doctrine can only be formulated long after experience and experimentation with new science-born modes of living make its emergence possible; and so it has been said, that the scientific knowledge of one generation becomes the common lore of the next.

The greatest of all values derived from a complete chart or pattern of living is that this time lag can be negotiated by a greater capacity for correction of errors as they arise, and in providing a more practical type of vision in fore-planning.

In the words of Dr. Trinca:

The need to-day is not more complicating technical extension of life, but enlargement of powers of management and administration of mankind's present science-born estate. A page of genuine and practically applicable elemental sociology in modern affairs is worth more than a world-wide power to travel at a thousand miles a second through space.

"The Missing Link in Democracy" is not an easy book to read. There are complicated diagrams which will puzzle those who have not the faculty for resolving abstract formulations on a pictorial basis. The text often passes too abruptly from the broad philosophical viewpoint to the purely contemporary. Sometimes the comparisons are involved. Whilst it may be said that such literary planning does not alter the underlying scientific truth, it certainly makes for an obscurity which might have been avoided.

The book is full of "meat", and whilst critics will think the author somewhat too optimistic, there is much truth in his remarks. He suggests the inauguration of a complaints board.

What is needed is a temporary "ministry and Office of (non-frivolous) Complaints", presided over by someone with the Beaverbrook touch and experience who has in his climb along the ladder of experience seen life whole, and has learnt the technique of history-taking where the inter-relationship of the cells of the civic mind and corpus are concerned.

Only so would the statistician of the future sifting this pabulum for what is of value, see how the other half lives.

Many of us would like to have a word with such a body—though possibly only on the understanding of secrecy. The chief practical plan which Dr. Trinca brings forward is the formation of a consultant panel system of a fully representative and permanent type.

If we wish to alter a system of Democracy on a basis that can compete with the new totalitarian and robot-minded efficiency of the Nazis (an efficiency which has come to stay in modified form) and yet retain freedom, some basic innovation is necessary. The solution seems to be obvious, for the elements for the purpose are already in existence, and need only to be expanded and more wisely and widely used. That is, we do not want a new order based on theoretical planning such as that which concentrates, e.g. on enlarging consumer's income, the destruction of Capitalism or any other nostrum. All that is required is a wider representation of the community brain and talent, providing new tracks of intercourse in knowledge and action, between the administrative brain and corpus of the body politic.

Such a panel would be recruited from every branch of learning and industry. Its objective would be the digestion of knowledge so that it could be handed over to the politicians.

In an imaginary address to this body the author uses these words:

You are a consultant library of living knowledge in the school of life, in the school of industry, fed from the fount of communal wisdom. If experience shows that such a body cannot safely express the will of knowledge as a body, then you must be called separately and in selective groups to act as adviser or advisers to the common weal. To save future millions from the sword, you might, with advantage on initiation, take the Hippocratic oath applied and adjusted to the processes of wider human relationships. The public and future youthful aspirants to your position must know of your oath, and public opinion condemn you for departure therefrom.

Dr. Trinca contents himself with sketching without detail the outline for a grand consultative body. The first need is to demonstrate its necessity.

The greater barrier to progress in Democracy to-day is the delegation of authority for civic progress too much to detached administrative onlookers who should operate in selective team work with chosen participants in the arena of practical progress. So only can a suffering public expect a constructive link between what would then be fully informed authority in a changing world, and this world of change.

Today, when we are spending millions, cost should not deter us from indulging in more social research. Knowledge is always a good investment.

That a widened consultant body would achieve something is certain. It is questioned, however, whether it could retain as much of the capitalistic democratic set-up as our author would like. Could it bridge the gap between community ideals and vested interest? If the views were radical, would the executive panel follow its directions or would its edicts have the fate of many royal commissions, a resting place in the pigeon-holes of Parliament House? Time only will show.

In conclusion Dr. Trinca must be congratulated not merely for taking a practical interest in sociology, but for a book which stimulates thought.

NURSES IN INDUSTRY.

Miss M. M. West is to be congratulated on her "Handbook for Industrial Nurses".¹ Designed for the English nurses, the work contains extracts from the relevant acts and regulations. Though not exactly the same as the Australian regulations, they differ mainly in that they are more explicit, and where they go further than the Australian they indicate where we fall short of what should be done.

Recently, and especially since this war began, the health of the industrial worker has been receiving closer attention, and the staffing of first-aid stations in Commonwealth munition factories has greatly increased the number of medical men and nurses actively engaged in this work. At such a time the appearance of this little book is peculiarly opportune. It is clearly and concisely worded and presents a very complete survey of the work of the industrial nurse. Nowhere in Australia have we yet achieved all that Miss West writes about; but we have gone far, and the book will be read with interest and advantage, not only by industrial nurses and those who are thinking of entering this interesting field of work, but also by medical men who are interested in the work, either because they are actively engaged in it or because their work brings them into contact with those who are.

Of particular interest is the section on record keeping, and whilst the methods adopted could be simplified with advantage, the author's brief general statement of the value of records is worthy of the attention of all, and her explanations of the utility of the various facts recorded are excellent.

Miss West presents a really complete account of the work of the industrial nurse, and indeed of the work of a fully equipped medical welfare department, and presents it in language which is clear and explicit, and without repetition or redundancy. The result is a very compact little book, which can be read and digested in just three or four hours of quiet reading.

¹ "A Handbook for Industrial Nurses", by M. M. West, S.R.N., S.C.M., with a foreword by Sir David Munro, K.C.B.; 1941. London: Edward Arnold and Company. Crown 8vo, pp. 148, with tables. Price: 3s. 6d. net.

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PERSPECTIVE.

The word perspective is defined in "The Concise Oxford Dictionary" as the art of delineating solid objects on a plane surface so as to give the same impressions of relative positions, magnitudes *et cetera*, as the actual objects do when viewed from a particular point. Another meaning given is the apparent relation between visible objects as to position, distance *et cetera*. The artist in drawing or painting a picture tries by perspective to create the impression of a three dimensional object on a two dimensional surface, and to produce a result that may be described as well proportioned. To venture on a discussion of perspective in art would be a hazardous business—it would savour too much of the fool rushing in as the time-honoured proverb puts it. It will be safe, however, to state that if the "relative positions, magnitudes *et cetera*" are exactly reproduced in drawing or picture, the reproduction will to all intents and purposes be a photograph. But the artist knows how to use perspective. Shakespeare tells us that "it is best painter's art" and the truth of this should at once be apparent. In the hands of the master it can produce noble and significant form. On the other hand we know that if in art all perspective is allowed to go by the board, the resulting abortion may be merely ugly or it may be so repulsive as to call in question the motives if not the sanity of the perpetrator.

If we use the word perspective figuratively, we refer to the relation in which parts of a subject are viewed by the mind. Human behaviour depends largely on human perspective; if our perspective is right and our judgement sound we shall act as upright and honest men should act and we may, like the master in art, set an example both noble and significant. The matter will stand examination. Our perspective in life has to do with what we see going on in the world around us, the world in which we live and move and have our being, but to which

we are not or should not be tied and enslaved. The word perspective comes from *per* meaning through, and *spicere* to look. If we look through, into the heart of, what is going on around us we should be able to discern its meaning and we should be in a position to judge where the current of life would lead us. If we are in the world and yet not of it, not tied or enslaved to it, this should be possible. Unfortunately it is the easiest thing in the world, from some passing self-interest or from listening to the blandishments of the selfish or even from weariness, to persuade ourselves that things are not really what they seem and to fashion for ourselves blinkers that we may find it difficult to discard. It will be useful to consider our perspective in several spheres. Since practically all the readers of this journal have studied medicine and are qualified to practise it, the perspective in medicine will be mentioned first. To have a proper perspective in medicine we need a periodical kind of stock taking or self-examination. Medicine appeals to us as a science or a group of sciences; it is also an agent for the prevention and cure of disease; more than this it is a means of livelihood for those who practise it. If we try to think of the medical sciences as a composite whole and also to have a full understanding of the ravages of disease and of the ignorance of people that stands in the way of disease prevention, there will be little danger of our setting up the practice of medicine as something to gain for us such imagined benefits as reputation, honour or wealth. Should honour, reputation and something more than a competence come to one whose perspective has been beyond reproach, the most resentful among his fellows would in all probability have little or no cause for complaint—position and money would be regarded as a trust to further the advance of medical science and to aid in its attack on disease. A second sphere—let us think of ourselves as ordinary citizens of a Commonwealth living among other people who, like ourselves, have hopes and fears, difficulties and anxieties, perhaps because of dependants who have to be clothed and fed and children to be educated. To have a perspective of all this we need to be more than arm-chair students; we have to study the whole social problem by seeing some of the hardships, some of the injustices, some of the social stupidities. To have a proper understanding of communal life as it is in Australia today would surely mean that we would not rest content to do less than our share of what was required to improve the lot of all the people. A third sphere must be mentioned. It concerns us all as Australian subjects, as individual units of an empire at war with a fierce and determined foe. There is a tendency at present, now that Australia has the enemy almost on its very shores, to blame certain persons in high places for deficiencies and failures. Let us try to see the whole war in proper perspective. If we succeed in doing this we shall realize that we must all take some of the blame for past deficiencies, for past failure to prepare. We shall also realize that the war near our homes is part of the war in Europe, and that war in London, Prague, Warsaw, in the Soviet cities, is just as horrible as war nearer at hand. Seeing the whole perspective, we shall be able to make a much greater, a much more united effort, and we shall avoid panic, than which nothing would be more disastrous.

A plea has been made for a full perspective in several spheres. It must be quite obvious that we can gain a proper perspective only if we push self into the background. We must presume that a man who has the courage to put himself on one side that he may face a problem squarely, will, once he has seen the problem as a whole, have the courage to do his duty. It may be objected that this whole discussion savours too much of idealism. Today we must be idealistic. We must aim at the stars. We may never, almost certainly never shall, gain them, but the higher our aim, the more likely shall we be to rise above the world of muddle and mediocrity; maybe we shall pass through the clouds that surround it into the sunshine above.

THE JOURNAL AND ITS CONTRIBUTORS.

THE function of this journal is to serve the members of the Australian Branches of the British Medical Association. It is primarily a general practitioner journal; but it is more than this. Within its pages are published papers from research institutes and workers in university, hospital and departmental laboratories. During recent years papers embodying the results of research have become more numerous; some of them have been published in this country and a certain number have been sent to specialist journals overseas. Those who control the journal have never believed that its pages should be devoted entirely to articles with a clinical bearing, much less to those with what is known as a bread and butter flavour. The medical public of Australia needs and in fact demands strong meat as well as bread and butter. It has therefore been our object whenever possible to provide readers with a balanced mixture of the purely scientific and the clinical. During the last few months the purely scientific has predominated. There are several reasons for this. In the first place many clinicians, capable of writing papers, or making and recording clinical observations, are serving with the forces overseas or are fully engaged with the Defence Forces in Australia. In the second place many of those not serving are so busy with their own practices and those of the absentees that there is little time and less inclination to put pen to paper. It is also probably true that laboratory workers are finding it difficult to send reports of their work to specialist journals on the other side of the world. If the last-mentioned statement is true we shall not grieve over much. We have always held that the results of Australian research should be published in Australia, and the facilities for publication are at present adequate. Should they become inadequate they would have to be extended.

There are indications that contributions of clinical value may become even less numerous than they are. It is becoming increasingly difficult to hold Branch meetings and suggestions have been made that certain of them might be abandoned. This would be a pity. If it is difficult to hold Branch meetings at night owing to black-out restrictions and for other reasons, the holding of discussions in the late afternoon might be considered. We would also point out that much time might be saved at Branch meetings if the rules regarding the length of papers were enforced and if contributions to the discussions were not invited by the chairman from persons

who obviously do not wish to speak and have nothing important to say. Branch meetings apart, readers must remember that the contents of a medical journal depend largely on its readers. If no contributions are offered, none will be published. Even though we are at war clinical observations will still be made; many of them should be recorded. Readers who wish to see the usual balance in the pages of this journal preserved are asked to remember this. Any one in doubt regarding material or the method of its presentation is invited to communicate with the Editor.

Current Comment.

MALIGNANT HYPERTENSION AND HYDATID DISEASE OF THE KIDNEY.

THE paper by Dr. B. T. Shallard on the treatment of essential hypertension, published in this issue, and the discussion that took place when the paper was read at a meeting of the New South Wales Branch of the British Medical Association, are of more than passing interest and merit the careful consideration of every general practitioner. Though the discussion was really devoted to treatment, something was said about the causation of the condition. This was not only unavoidable, but necessary. The remarks of Dr. F. B. Byrom in the discussion are very much to the point. Incidentally readers should know that Dr. Byrom is qualified to speak on this subject, for he is an authority on it, his work being recognized the world over.

The Sydney discussion lends particular interest to a recent article by J. Davson,¹ who writes from the department of pathology at the Victoria University of Manchester. He reports a case in which malignant hypertension was associated with hydatid disease of the kidney. Davson states that he has reported the case because it seems probable that the mechanism of the production was similar to that by which hypertension has been produced experimentally by Wilson and Pickering, by Goldblatt, and by Wilson and Byrom—that is, by constriction of one or both renal arteries. In the case described by Davson the patient was a married woman, aged twenty-five years, who was admitted to hospital in August, 1940, complaining of headache, vomiting, cough, weakness and lassitude of about two years' duration. Three weeks before her admission to hospital her systolic blood pressure was 220 millimetres of mercury. After her admission the heart was found to be enlarged, the apex beat being external to the mid-clavicular line. The systolic blood pressure was 200 and the diastolic pressure 100 millimetres of mercury. The blood urea concentration, which was 196 milligrammes per centum, rose before the patient died ten days later to 378 milligrammes. The clinical diagnosis was chronic nephritis. No details of the clinical history are given to allow the reader to decide whether investigations were made which might have revealed the unilateral kidney condition that was discovered at autopsy. But as we shall see later, discovery would probably have been too late to allow the circulation to recover itself. At post-mortem examination the lower pole of the right kidney was found to be occupied by a cystic swelling measuring six by five centimetres. This proved to be a hydatid cyst. The residual renal substance measured eight millimetres at its thickest part and three millimetres where it had been encroached upon by the cyst. The left kidney was somewhat enlarged. On microscopic examination the appearances of the right kidney were similar to those seen in a long-standing hydronephrosis which had produced compression of the

¹ *The Journal of Pathology and Bacteriology*, September, 1941.

renal substance. Many of the glomeruli were completely fibrotic, and irregular fibrosis was present throughout the parenchyma. In the renal substance near the cyst wall were several fairly large branches of the renal artery showing fibrosis of the media and partial or complete fibrous obliteration of the lumen. Smaller branches of the renal artery within the surviving renal parenchyma showed variable degrees of intimal fibrosis. There were no signs of necrotizing arteritis nor of focal glomerular necrosis. In the left kidney few of the glomeruli were normal; focal necrosis affected about a quarter of them. In addition, many showed varying degrees of hyalinization and a few were completely fibrosed. Afferent arterioles showed necrotizing arteritis; others showed degrees of intimal fibrosis up to complete obliteration of the lumen. In contrast with the larger branches of the right renal artery near the cyst wall, the larger branches of the renal artery within the substance of the left kidney showed no pathological change. These changes may be summed up by the statement that in the left kidney the characteristic histological picture of malignant hypertension was present; in the right there were no such typical appearances, the changes affecting the moderately large branches of the renal artery.

This case may be discussed from two points of view. The first is that of cause and the second that of treatment. Davson is particularly interested in the first. He asks whether the malignant hypertension developed as a result of the presence of the hydatid cyst or whether it was the terminal phase of a preexisting chronic nephritis. If a preexisting chronic nephritis had been the cause, it would be right to expect to find more extensive fibrosis of the glomeruli of the left kidney and a considerable disorganization of its architecture. The fibrotic glomeruli of the right kidney are the result of compression by the cyst of the blood vessels of the kidney or are secondary to the hydronephrosis. Davson thinks that the absence of typical lesions of malignant hypertension from the right kidney at least indicates that constriction of its vessels occurred before the development of the hypertension. He concludes that this case furnishes an example of the operation in the human subject of the "Goldblatt mechanism" of the production of hypertension. This is probably correct. At the same time it would be of interest to know the family history of the patient in regard to predisposition to hypertension—the so-called Goldblatt mechanism would probably be more likely to operate in an individual predisposed to vascular disease. The second aspect of treatment is not mentioned by Davson, but it is of interest from the point of view of the recent discussion. Here Dr. Byrom's remarks are illustrated. There is no doubt that this patient's condition had lasted so long that changes induced in the left kidney by the lesion in the right were irreversible by the time she was admitted to hospital.

THE CONDITIONED REFLEX CLINICALLY CONSIDERED.

In a recent number of *The New England Journal of Medicine* the conditioned reflex of Pavlov is the subject of three articles in which a plea is advanced for the wider clinical recognition of this response.¹ Quite a number of aberrances of behaviour, such as obsessions, anxieties and inhibitions, can be classified as conditioned reflexes, and the aim of the psychiatrist in treatment is really to "decondition" or "recondition". A detailed description is given of a boy of fifteen of good physique and intelligence, who was unhappy at home through the conduct of his father. After leaving home, despite sympathetic handling and excellent chances for success in life, he developed a violent antagonism towards any teacher or employer who possessed some characteristic in appearance, voice or manner reminiscent of his father. This attitude of the boy

is perfectly understandable and would be regarded as a very simple case indeed in the domain of modern psychoanalysis. One of the authors, Harold L. Higgins, assistant professor of pediatrics in the Harvard Medical School, asks us to accept as conditioned reflexes lesions which transcend the ordinary effects of nervous discharges.² Asthma and diarrhoea present no difficulty, as the nervous element is acknowledged; but it comes as a surprise to find allergic conditions described as happening in the absence of the specific allergens or an inflammatory reaction with pyrexia in the absence of infection. Amongst typical cases mentioned is that of a girl who had hives at a boarding school, but when she went home these disappeared. Thereafter going back to school or even getting on board the train after the holidays brought on the skin eruption once more. Another child developed coryza with a rise in temperature under similar conditions. A scientist suffered from puffy eyes resembling angioneurotic oedema when facing the stress of an important lecture. Higgins rightly points out that the training of an infant in bowel habits is an application of the conditioned reflex, for after a while merely placing the baby on the proper chair or receptacle can excite evacuatory colonic peristalsis and rectal contraction. The authors on the whole prove their point that in diagnosis where the direct causative agent is not manifest the possibility of a conditioned reflex should be borne in mind. It is also of interest to note that in a recent paper D. M. Dunlop³ refers to the possibility that flatulence and heartburn may arise from a conditioned reflex.

IN MEMORY OF ASTLEY PASTON COOPER.

A SPECIAL issue of *Guy's Hospital Reports*, Numbers 2, 3 and 4 of Volume XC, 1940-1941, has been dedicated to Sir Astley Paston Cooper in commemoration of the centenary of his death. Astley Cooper was a master-surgeon, one of those described by Wood Jones as great men, the elect, built upon big lines—men of fine and outstanding personality. Sir Charters J. Symonds, who has contributed the opening article on Cooper, tells us that the life of Astley Cooper affords an example of great industry, of temperance in all things and of the importance of independent inquiry. We might add to this that he had generosity of mind and had it in a degree that would put to shame most men of medicine of the present day. Although apprenticed to his uncle, William Cooper, he lived with Cline, surgeon of Saint Thomas's. His apprenticeship started when he was sixteen years of age and Cline had a great influence on him. He referred to Cline as "my most able and judicious preceptor". He dedicated his book on hernia to Cline and in the dedication wrote: "Many of the ideas which it contains have been derived from your public and private instruction." His path was not strewn with roses and doubtless this had a good effect on his character. He had to fight political prejudice and in his application for appointment to Guy's Hospital was assailed by that most vile weapon, the anonymous letter. However, he had made such a reputation as a lecturer and teacher that he obtained unanimous support for his candidature. "He had made himself so beloved by the pupils and so essential, that . . . something like a riot would have taken place had he not been appointed." For his position he was well equipped. "Though he had not performed many operations, he had acquired by his dissections such a knowledge of anatomy as would enable him to operate with accuracy and speed, and from his experiments on animals a refinement of technique not possessed by any of the other competitors." Cooper made important contributions to surgery—perhaps his tying of the abdominal aorta is best remembered, for it was no mean achievement in the pre-Listerian days. The Editor of *Guy's Hospital Reports* is to be congratulated on this number; it will be read with interest and profit.

¹ *The New England Journal of Medicine*, November 13, 1941.

² *Edinburgh Medical Journal*, November, 1941.

Abstracts from Medical Literature.

GYNÉCOLOGY.

Suppurative Ophoritis.

JORGE LUIS AHUMADA (*Revista Médica Latino-Americana*, July, 1941) records his observations in 66 cases of suppurative ophoritis. This type of infection is always of bacterial origin and has to be distinguished from degenerative processes, non-bacterial inflammations of the organ *et cetera*. Predisposing factors are exposure to cold, overwork and sexual disorders. The most frequent cause is intrauterine manipulation (28.8% of cases), usually in the form of criminal abortion (19.7% of cases), but also following operative procedures on the *cervix uteri* and intrauterine curettage. One case was attributed to the use of a contraceptive button inserted into the uterine cervix. Next in frequency (16.7% of cases) are those infections which appear during menstruation; these had no apparent cause, except one case which was held to result from coitus during the menstrual period. In 12.1% of cases the condition arose *post partum*. Rare causes were infected myomata, and one case, occurring in a young virgin, resulted from the squeezing of a furuncle in the external auditory meatus. In 26 cases no definite cause could be found, although in three of these gonococci were present in the cervical canal. The condition was bilateral in 6.1% of cases; where it was unilateral, left-sided infection preponderated in the ratio of 32 to 26. Perforation of the abscess is rare; it can take place in one of three directions: (a) into the abdominal cavity, (b) into adjacent hollow viscera and (c) into the abdominal wall. The first type of perforation is very rare and can occur only in fulminating cases before adhesions form to wall off the abscess. In one case of the series perforation occurred into the bladder, in two into the rectum and in another into the rectum and vagina simultaneously. Of the cases, 86.1% occurred between the ages of twenty-one and forty-five; four cases occurred in patients under twenty, the youngest being a virgin of fourteen years. One case occurred during the menopause.

The Use of Silver Picrate in Vaginitis.

J. D. CORBIT, JUNIOR, ROBERT McELROY AND J. H. CLARK (*The Journal of the American Medical Association*, November 22, 1941) present the results of a five-year study of the value of silver picrate in the treatment of vaginitis. Diagnosis is made by smear and culture. Both *Trichomonas vaginalis* vaginitis and moniliasis have been treated. When the diagnosis is established the vagina is cleansed according to the technique of Savitz, Golub and Shelanski, reported in February, 1940. The vaginal mucosa and cervix are swabbed with a cotton sponge saturated with kaolin-alumina mixture (aluminium hydroxide and colloidal kaolin suspension, to which have been added minute quantities of thymol, eucalyptol and menthol). The area is then swabbed with another sponge saturated with sterile water and then with a dry sponge. The combined powder insufflation and suppository technique of treat-

ment recommended by Golub and Shelanski (1937) is employed. Five grammes of 1% silver picrate in kaolin are insufflated into the vagina. The patient is given six silver picrate suppositories and instructed to insert one each night before retiring and to use a pad. Douches, tub baths and intercourse are forbidden while she is under treatment. The treatment is repeated every week until the symptoms have been relieved and examination of smears fails to disclose the organism. In most cases two insufflations are enough; sometimes additional insufflations are necessary. If tests of a patient give negative results after three consecutive menstrual periods after cessation of treatment, she is considered cured. Of 1,646 patients suffering from trichomoniasis 94.1% were cured, and of 151 patients suffering from moniliasis 97% were cured. Cure of these conditions has been found to bring about cure of lower abdominal and back pain in many cases. The authors stress the value of a vaginitis unit in a gynaecological clinic.

Observations on *Clostridium Welchii* in the Vagina of Pregnant Women.

J. F. SADUSK, JUNIOR, AND C. P. MANAHAN (*American Journal of Obstetrics and Gynecology*, May, 1941) have made observations on a series of 219 consecutive patients in an antenatal clinic at the Johns Hopkins Hospital. *Clostridium welchii* was recovered by cultural methods from the vagina of 8.7% of the patients. Puerperal infection was no commoner among those from whom the organism was recovered than among those from whom it was not recovered. The authors conclude that recovery of the organism from the vagina does not necessarily imply infection by it, nor is it necessarily of serious import.

Origin of Cysts of the Broad Ligament.

B. GILBERT AND B. K. SHROUT (*The Journal of Obstetrics and Gynecology of the British Empire*, October, 1941) discuss the origin of cysts of the broad ligament and describe one which with the Fallopian tube and ovary had undergone torsion. They deal first with the origin of the vestigial structures of the broad ligament and then discuss the views that are held regarding the method by which the testis cords are joined to the genital mesonephric tubules. Cysts in the broad ligament may be derived from (i) the pronephric system; (ii) the Wolffian duct and its diverticula, (a) genital tubules (epoophoron), (b) nephritic tubules (paroophoron); (iii) the Müllerian duct; (iv) the junctional tubules; (v) duplications of (i), (ii) or (iii); (vi) from other structures, such as lymphangioma. The authors discuss the theoretical varieties of cyst which may be found in the broad ligaments: cysts derived from Müllerian elements, cysts derived from pronephric elements, cysts derived from Wolffian elements, cysts derived from junctional tubules. On macroscopic examination in the operating theatre it is not easy to determine the exact structure from which a cyst arises. It can, however, be said that the large broad ligament cysts, such as those pictured in textbooks on gynaecology, are derived from junctional tubules (rete); small cysts are derived from the vestigial structures, which may be called the parovarium, that is, the Wolffian duct in the broad ligament and the genital

and nephric tubules. It should be possible for a pathologist, given sufficient tissue, to say to which group any particular cyst belongs. Since many cysts that form in the broad ligament are not of parovarian origin according to accepted definitions of the parovarium, it would be best to drop the use of the expression "parovarian cyst" and to substitute the non-committal term "broad ligament cyst", leaving the determination of the site of origin to the pathologist. If a cyst of the broad ligament undergoes torsion, it will be one which is primarily placed in the angle formed by the ovarian fimbria and the ovary; in nearly all cases it will be of junctional origin.

Sulphathiazole in the Treatment of Gonorrhœa in Women.

PAUL F. FLETCHER, ORA J. GIBSON AND S. EDWARD SULKIN (*The Journal of the American Medical Association*, November 22, 1941) have studied the sulphathiazole treatment of gonorrhœa in women. The number of hospital patients studied was 194. Two methods of treatment were used. The first method consisted of the oral administration of 60 grains of sulphathiazole per day for five days and the insertion of a vaginal suppository containing β -lactose and boric acid. The suppository was inserted once a day for twelve consecutive days. In the second method the same dose of sulphathiazole was given, but the β -lactose was omitted. Toxic manifestations were noted in 13 cases, and in two instances were so severe that treatment had to be stopped. The most pronounced reaction was the appearance of a painful urticarial rash. In seven cases mild nausea and malaise were present, and these were relieved by the administration of 7.5 grains of sodium bicarbonate for each dose of sulphathiazole. One death occurred in the series, the patient being a drug addict and also suffering from syphilis and acute malaria. Every case was classified as chronic gonorrhœa with the exception of two, in which there was an acute inflammation of the cervix, urethra and both adnexa, associated with a severe febrile reaction. The patients who were regarded as suffering from chronic gonorrhœa presented no symptoms. Of all the patients in the series, 45% had a gonorrhœal infection of the cervix alone, in 12% the urethra only was involved, while in 43% both cervical and urethral infections were present. Every patient in whom the healthy adnexa were present showed some type of chronic inflammatory condition. The authors conclude from their analysis of the two groups of patients that β -lactose therapy had no influence on the treatment of the gonococcal infection. Of the patients under observation at the end of a "quarantine parole" period (twelve weeks), 91.2% were regarded as having been clinically cured. The authors state that sulphathiazole is in the great majority of cases highly effective in the treatment of gonococcal infections in the female.

Gonococcal Vaginitis.

JOHN L. RICE, ALFRED COHN AND ELEANOR L. ADLER (*The Journal of the American Medical Association*, November 22, 1941) report the results of research work begun in 1938 on gonococcal vaginitis. Of 1,715 children examined, 381 were found to have the disease. The chief objects of investigation were diagnosis, criteria of cure, epidemiology and the value of different

methods of treatment. Non-specific vaginitis and gonococcal vaginitis can be differentiated only by smear, by culture or by both methods. An arbitrary standard of cure was set up; clinical cure was demanded, and at least seven consecutive smears and attempted cultures made in a period of at least sixteen weeks should on examination fail to reveal gonococci. The standard was found to be satisfactory in 92.2% of the cases studied. Sixteen patients once more yielded positive signs of the disease sixteen weeks after they had first given negative results to the tests. It was impossible to determine whether a recurrence or a new infection was responsible. Forty-one children recovered without treatment of any sort. Thirty-three children were treated with oestrogenic substances; 12 were cured. Bacteriologically, cure in this group was no more frequent than in the untreated group; but clinical improvement began shortly after treatment was begun. Of 53 children treated with sulphamylamide, 23 were cured after an average of 9.6 days. Of 77 children treated either with sulphapyridine or with sulphathiazole, 67 were cured after an average of 6.7 days. Sulphathiazole produced fewer toxic reactions than sulphapyridine. The investigation proved that the general belief that gonococcal vaginitis is extremely contagious is erroneous. Tests carried out indicate that many formerly reported epidemics of vaginitis were not due to the gonococcus. Transmission of the disease requires intimate contact between infected adult or child and non-infected child. Contaminated fomites may possibly help to spread the disease. The authors recommend that children should not be excluded from school because of gonococcal vaginitis, except during the stage of profuse discharge. Sex play should be prevented by adequate supervision. Treatment with sulphathiazole would cure most infected children within a few days. Children who must be admitted to hospital because of complications or the occurrence of other diseases need not be placed in separate isolation wards, though aseptic technique during the first few days should be practised by the nursing staff. Cultures should be used for diagnosis and as criteria of cure. Follow-up study should last for at least sixteen weeks. Family contacts should be examined to discover the source of infection.

OBSTETRICS.

Erythroblastosis and Transfusion Accidents in Pregnancy.

L. BURNHAM (*American Journal of Obstetrics and Gynecology*, September, 1941) calls attention to the common aetiology of erythroblastosis and transfusion accidents in pregnancy. It is claimed that the aetiology of *erythroblastosis foetalis* resides in an immunological incompatibility between fetus and mother. In other words, there is present in the fetal red blood cells an antigen inherited from the father which is lacking in the mother. This antigen diffuses from the child into the mother's circulation and stimulates the formation of destructive antibodies. The author shows that a 50% chance of death arises if a mother of a baby with erythroblastosis needs a transfusion, because, should the transfused blood contain the antigen referred to, the

destructive antibodies in the mother's blood will agglutinate and hemolyse the transfused blood, causing oliguria with its frequently fatal consequences.

Placental Blood Plasma.

R. M. CURTIS AND R. W. WORLINGTON (*American Journal of Obstetrics and Gynecology*, September, 1942) make a plea for a greater use of plasma obtained from placental blood. They found that sterile plasma could be obtained from placental blood in worthwhile quantities. In a series of 200 placentas an average of 103 cubic centimetres of whole blood was derived from each. From 128 cubic centimetres of citrated placental blood they obtained an average of 70 cubic centimetres of consistently uncontaminated citrated plasma. The technique of collection is rigid and the authors have not so far recovered a single organism by culture methods, despite the fact that over 250 cubic centimetres of pooled plasma have been cultured aerobically and anaerobically. The placental plasma can be prepared and stored and transported and used in all ways in which adult plasma can be used. With a very little effort a hospital with or without a blood bank but with a maternity service could prepare blood plasma for clinical use, and in a time of national emergency placental blood heretofore discarded could be collected and sent to depots for the preparation of plasma and storage.

The Effect of Intramuscular Injections of Whole Blood on the Prothrombin Index of the Newborn Infant.

THE value of intramuscular injections of whole blood in the prevention and treatment of hemorrhagic disease of the newborn infant has been discussed by S. S. Geilis and R. A. Lyon (*American Journal of Obstetrics and Gynecology*, September, 1941). The prothrombin indices of 78 newborn breast-fed infants were determined for the first five days of life. Forty-four of these infants received intramuscular injections of whole blood and thirty-five did not. When the prothrombin indices of the two groups were compared it was observed that a single intramuscular injection of 20 cubic centimetres of maternal blood had little or no effect in checking the decline of the prothrombin index during the neonatal period, or in hastening its return to normal values.

The Prevention of Foetal Deaths.

A. H. ALDRIDGE AND R. S. MEREDITH (*American Journal of Obstetrics and Gynecology*, September, 1941) discuss the question of the prevention of foetal mortality. They base their review on the period 1935 to 1939. During that period 7,661 viable babies were born; of these, 271 were either born dead or died within one month, giving a mortality rate of 3.5%. Because a very high percentage of neonatal deaths among premature infants is due to birth trauma and asphyxia, the responsibility of an obstetrician does not end with the delivery of a living premature infant. The cause of death was established by autopsy in 75% of the cases. Trauma and asphyxia were responsible for 75% of the deaths, congenital defects for 13%, and miscellaneous causes for the remaining 12%. It was noted that 41% of the babies were either distressed or dead before delivery was attempted, and from this it may be assumed that death was due

to labour rather than to delivery. Timely operative interference would almost certainly have saved the lives of some of these infants. In all that has been written regarding so-called conservative obstetrics, no condition has received more attention than the occipito-posterior position. The advice has invariably been to leave the occipito-posterior position to Nature, with the assurance that if given sufficient time favourable rotation will occur. However, the author believes that if all women with occipito-posterior positions were carefully followed during the course of their labour it would be possible by timely interference to save more babies with less harmful results to their mothers. If fetal deaths from conditions associated with occipito-posterior positions are to be prevented, the indication for operative interference should be unsatisfactory progress of labour rather than fetal distress.

Post-Toxæmic Hypertension.

L. C. CHESLEY, W. H. SOMERS, H. GORENBERG AND J. A. MCGEARY (*American Journal of Obstetrics and Gynecology*, May, 1941) discuss post-toxæmic hypertension. They give a short historical summary and conclude that the earlier literature was wrong in indicating that chronic nephritis was the common sequel of toxæmia of pregnancy. In the period 1935-1936 the incidence of toxæmia in 10,500 deliveries was 6%. In 1940 the authors examined 466 of the patients who had been affected by toxæmia. There is an important relationship between the duration of toxæmia and the subsequent incidence of hypertension. The authors conclude that 50% of toxæmic patients will have residual hypertension if their condition is not improved in twenty-one days. The gross incidence of hypertension was 53%. A patient was regarded as suffering from hypertension if the systolic blood pressure was 140 and the diastolic pressure 90 millimetres of mercury. The renal efficiency test (urea clearance) showed that only 7% of patients had any demonstrable renal damage five years after their toxæmia. The fetal mortality rate rose to 20% if the patient had toxæmia for a period of more than a month.

Diabetes in Pregnancy.

ALFREDO LUBLIN (*Revista Médica Latino-Americana*, August, 1941) emphasizes the necessity for a very close collaboration between the gynaecologist and the physician in every case of pregnancy complicated by diabetes. In reply to gynaecologists who criticize this suggestion, the author points out that in dealing with the disordered metabolism of a pregnant diabetic the gynaecologist is on very dangerous ground and thus should leave to the physician or specialist in diabetes the control of the anti-diabetic régime throughout pregnancy, the accouchement and the post-partum period. He recommends that such patients should pass the accouchement and post-partum period in a clinic under the charge of a physician. The management of diabetes, including insulin treatment, is a specialized branch of medicine; in the treatment of a pregnant diabetic the views of the gynaecologist and the physician may differ, but it is the latter's recommendations which should be followed. If this idea is put into practice the problem of the pregnant diabetic loses much of its difficulty and as a result many mothers and babies may be saved.

British Medical Association News.

SCIENTIFIC.

A MEETING of the New South Wales Branch of the British Medical Association was held on November 27, 1941, at the Robert H. Todd Assembly Hall, British Medical Association House, 135, Macquarie Street, Sydney, COLONEL WILFRED VICKERS, D.S.O., V.D., the President, in the chair.

The Treatment of Essential Hypertension.

DR. B. T. SHALLARD read a paper entitled "The Treatment of Essential Hypertension" (see page 166). A cinematograph film from the Mayo Clinic was then shown by courtesy of the New South Wales Permanent Post-Graduate Committee in Medicine; it portrayed the operation of sympathectomy for the relief of essential hypertension.

DR. F. B. BYROM said that although treatment was outside his province, he had been very interested to hear Dr. Shallard's paper and was glad to hear that Dr. Shallard was so honest about the obscurity of the cause of essential hypertension. Following the work of Goldblatt there had been a widespread tendency to assume that all hypertension was due to interference with the blood supply to the kidney. There was undoubtedly a renal element in nephritic hypertension and also in the later stages of malignant essential hypertension. But if renal ischaemia was the primary cause of "essential" hypertension then there must be a primary obstruction of the renal vessels, which must be either structural or functional. Structural changes were certainly present in the renal arteries and arterioles in essential hypertension, apart from occasional cases in which a main artery happened to become fortuitously obstructed by an atheromatous plaque. These changes were not confined to the kidney, and in the absence of evidence to the contrary must be assumed to be the result and not the cause of the hypertension. If the alleged ischaemia was not structural it must therefore be functional; in other words, a spasm of the renal vessels. It had been demonstrated that there was an increased tonus of the arterioles in general in hypertension, and the kidney was not exempt, but there was no evidence that the spasm in the renal vessels was greater than elsewhere, and even if this should prove to be correct it would still be necessary to discover the cause of the spasm. Knowledge of the primary cause of essential hypertension therefore remained as remote as ever, as Dr. Shallard had indicated, and the various forms of treatment, including sympathectomy, were still based on purely empirical grounds. Dr. Byrom pointed out that almost any operation performed on a hypertensive animal, or even administration of an anaesthetic, might cause prolonged reduction of blood pressure. He presumed that workers dealing with human hypertension were fully aware of this factor and had taken it into account in assessing the results of sympathectomy. Dr. Byrom had hoped that Dr. Shallard would refer to the relation of "essential" hypertension to unilateral disease of the kidney. Much had been written recently on this subject, and all types of renal disease from tuberculosis to tumour had been mentioned. It was, however, very difficult to gather from the literature how often unilateral renal disease could be incriminated in "essential" hypertension. He imagined that the proportion of such cases was very small, but probably it was sufficiently high to make it worth while to investigate any patient with essential hypertension to see whether the condition arose in the kidney.

It had been assumed, rather facilely, that where hypertension could be attributed to unilateral renal disease excision of the offending kidney would cure the hypertension. A number of such cures had now been reported, but most reports referred to one, two or three isolated cases. Naturally a surgeon essaying the experiment would be more tempted to publish the notes of a case if the experiment were successful. It was well to sound a warning against undue optimism. The patient with hypertension arising out of disease of one kidney was exactly like to the rat rendered hypertensive by a clamp on one renal artery. The results of nephrectomy in such a rat depended on the degree and duration of the hypertension. If the hypertension was moderate and of short duration, the blood pressure returned to normal immediately after nephrectomy. But if the hypertension was severe and if nephrectomy was delayed, then the hypertension had produced in the opposite kidney structural narrowing of the renal arterioles. When the clamped kidney was excised in such animals—in other words, when the primary cause of the hypertension was removed—the hypertension persisted. In this instance he thought it was

quite fair to argue from the rat to the human being and to predict that where unilateral renal disease was associated with hypertension it must not be expected that nephrectomy would always cure the patient. It all depended on whether the operation was undertaken before the hypertension had had time to cause irreversible structural changes in the vessels of the opposite kidney and so to set in train the vicious circle to which there could be only one end, namely, renal failure and death.

DR. A. J. GIBSON expressed his appreciation of Dr. Shallard's paper. He said that essential hypertension was the bugbear of obstetricians; it was exceedingly common and caused much trouble. Dr. Gibson had been very interested to hear Dr. Shallard's definition of what was taken to be normal blood pressure. For a long time, from the point of view of obstetric practice, Dr. Gibson had regarded a pressure of 130 millimetres of mercury systolic and 80 diastolic in any pregnant patient early in pregnancy, no matter what the age of the patient, as an indication that there would be trouble sooner or later; his expectations were usually fulfilled. There was one point that he would stress: if they wanted to preserve the life and health of many of their patients, it was necessary to watch the blood pressure closely and be suspicious of the figures he had quoted. Sometimes he was told by the patient's medical attendant that the blood pressure had been normal all through the pregnancy, and on inquiry he had found that it had been 140 millimetres of mercury systolic and 100 diastolic. Clinically three types of toxæmia of pregnancy could be distinguished: (i) preeclamptic toxæmia, (ii) nephritic toxæmia, and (iii) the essential hypertensive type. With regard to (iii), the family history was important: a bad family history in this respect was nearly always followed sooner or later by a good deal of trouble during pregnancy if the patient persisted in having children. If a young woman with hypertension became pregnant, often she had one child without any trouble. If she had another she might be fortunate, but it was impossible to say. Often a third pregnancy meant a very high rise of blood pressure early in pregnancy, and the pressure did not fall to normal after delivery, but remained permanently higher than before. It was dangerous for a patient with high blood pressure to have too many children. If an elderly primipara was hypertensive, two complications might occur: death of the fetus from placental infarcts and death of the mother from accidental hemorrhage. In these cases it was sometimes unwise to allow the pregnancy to go beyond the thirty-sixth week; a Cesarean section should be performed. It had formerly been thought that there was a possibility that patients with toxæmia of pregnancy or eclampsia might have chronic nephritis afterwards; but actually very few cases of nephritis followed such a condition, although persistent hypertension was exceedingly common. If toxæmia of pregnancy went on for much more than four weeks, then some degree of hypertension was left and each pregnancy made it worse. Dr. Gibson uttered the plea that hypertension in a pregnant woman, even if it was symptomless, should be regarded as serious. He cited the case of a woman who had been admitted to the Women's Hospital in what was described as an eclamptic fit. While she was there she developed auricular fibrillation, acute edema of the lungs, "solid" albuminuria and cerebral hemorrhage; the systolic blood pressure was 250 and the diastolic pressure 150 millimetres of mercury. They struggled to combat each condition and to maintain her life, but she died. Dr. Gibson telephoned to the woman's own medical attendant to ask what her earlier blood pressure had been during pregnancy. The doctor replied that, as the patient had had no symptoms and had been perfectly healthy, it had been unnecessary to estimate her blood pressure. In conclusion, Dr. Gibson asked Dr. Shallard whether he had any experience in the use of sodium sulphocyanate in the hypertension of pregnancy. Dr. Gibson wondered whether it would be safe to use it.

DR. BYROM spoke again on a point suggested by Dr. Gibson's remarks, referring to an unexpected finding in experimental hypertension. If a female animal was made hypertensive and then allowed to become pregnant, the blood pressure fell progressively until at full term it was often normal. Immediately after parturition the blood pressure began to rise again to the previous level.

DR. E. H. STOKES congratulated Dr. Shallard on the judicial way in which he had presented his subject. Dr. Stokes said that he had had no experience of either the use of sulphocyanate or operation in hypertension. He had been put off sulphocyanate by an article from the Peter Bent Brigham Hospital appearing about ten years earlier in *The Journal of the American Medical Association*. Although the cause of essential hypertension was not known, a suggestion had been put forward by Houston, an American

worker, who had visited China; he had noticed that there were no hypertensive Chinese in Peking. He considered that essential hypertension was a conditioned reflex arising as a result of Western civilized life. Dr. Stokes wondered what Dr. Shallard would think of that theory.

DR. V. M. COPPLESON said that he had not performed the operation under discussion, but he had seen it carried out in America by the surgeons mentioned by Dr. Shallard. He had seen the work done by Adson and Love at the Mayo Clinic, and by Peet at Ann Arbor. At the Mayo Clinic the operation was performed in two stages, first on one side, then on the other side three weeks later. Dr. Coppleson had received the impression that the operation was not usually carried out on people aged over forty-five years; it was preceded by careful testing of the patient and of his blood pressure reaction to rest *et cetera*. The operation was not very difficult, but it required special instruments. The mortality rate was not high; there had been no deaths up to the time he was at the Mayo Clinic. The results were not quite certain. It was disappointing that there were not more falls in the blood pressure; but there was no doubt that the patient's symptoms were often greatly relieved. One medical practitioner who underwent the operation said that his condition had immeasurably improved as far as symptoms were concerned, although his blood pressure was not much reduced. At Ann Arbor Peet used another operation; he sectioned the splanchnic nerves in the thorax, while at the Mayo Clinic the site was below the diaphragm. The general opinion was that operation did bring about symptomatic improvement. Dr. Coppleson said that he had been amazed at the time at the figure of 50% as the mortality rate over a five-year period, but this did not appear to be high in comparison with the figures given by Dr. Shallard. The operation that preceded the one at present used was that described by Forster, who divided every second posterior nerve root. This had been given up. In conclusion, Dr. Coppleson said that he could not speak with authority, but could only give his impressions of the work of surgeons in the United States of America.

DR. A. S. READING asked a question. He said that in taking the blood pressure in both arms he had noticed that the pressure on one side might be as much as 40 millimetres of mercury less than that on the other side. What was the explanation, and which was the correct figure, the lower or the higher?

DR. W. L. CALOV said that he did not understand why nobody had mentioned the method of taking the blood pressure. When Dr. Shallard had quoted large numbers of figures he had said something to the effect that readings of 130 millimetres of mercury systolic and 80 diastolic were abnormally high; Dr. Calov wondered which method of recording the blood pressure had been used. He had always regarded the figures mentioned as indicating quite normal blood pressure. The same comment applied to Dr. Gibson's remarks. If the systolic blood pressure was taken by digital pressure on the radial pulse, the reading was higher by some millimetres than when it was taken by the auscultatory method. Some people took the diastolic reading where the sound ceased, others where the sound was last heard sharply. There might be a difference of five to ten millimetres in the figures obtained by the two methods. One could not gauge the severity of the disease or actually define it in terms of numbers or figures. It was common to find a subject with a blood pressure of 160 millimetres of mercury systolic and 100 diastolic who appeared to be perfectly normal and had been like that for many years; Dr. Calov had known many such people. One wondered whether they should be called hypertensives or whether that was their normal state.

DR. W. J. McCristal asked Dr. Shallard to give his views on venesection as affording symptomatic relief in essential hypertension. Dr. McCristal said that a few years earlier, with a desire to develop the technique of blood typing and secure a few donors round the district, he was impressed with the relief obtained from such symptoms as headache, giddiness and effort angina. In one or two instances hypertensives were so satisfied with the relief given as to return in six weeks for a repetition. However, Dr. McCristal had always had some mental reservations as to the validity of this measure in cases of angina from myocardial ischaemia, fearing to accentuate this factor by lowering the tension in the coronary circulation.

Dr. McCristal had been impressed by the results stated from sympathectomy. He wondered whether use had been made in these cases of the cholinergic drugs, such as prostigmin. In conclusion Dr. McCristal thanked Dr. Shallard for his interesting and stimulating paper.

DR. C. M. EDWARDS said that he had had very little experience in unilateral kidney disease in hypertension, but he had been impressed with several cases. He had fallen in badly in one case. The patient had passed beyond the labile stage of the disease when nephrectomy was performed. In a second case Dr. Edwards was much more careful. He thought he had found unilateral kidney disease, an uninfected hydronephrosis of considerable size possibly obstructing the renal artery. He had drained it with a catheter, and the blood pressure fell no less than 20 millimetres of mercury. The operation was performed and brought relief, but the blood pressure was again rising, and at present was always above 150 millimetres of mercury systolic. Dr. Edwards did not regard the case as ideal. From what he had read, all surgeons performing these operations were in grave doubt about the ultimate results. The period for which the operation had been performed was not long enough to allow the final assessment to be made. It was necessary to be careful not to undertake the operation lightly. In conclusion Dr. Edwards said that he had been impressed with Dr. Shallard's paper and with the remarks made by some of the other speakers.

DR. F. HALES WILSON asked Dr. Shallard whether he could give any information about the age groups of the patients to whose mortality rates he had referred. Dr. Wilson said that his impression was that the mortality rate among younger patients with hypertension who had had the condition for more than five years was not nearly so great as the figures quoted indicated. Another matter to which Dr. Wilson referred was a point raised by Dr. Reading, who had found a difference of as much as 40 millimetres of mercury in the blood pressure readings for the two arms. Dr. Wilson said it was unwise to rely on this difference unless one went back to the first arm to test whether the pressure had altered in the interval.

DR. SHALLARD, in reply, said that the title of his paper was "The Treatment of Essential Hypertension", and that he had made no attempt to outline the aetiology or deal with the relation of kidney conditions to hypertension. Renal hypertension was to be differentiated from essential hypertension. The work of Goldblatt in 1933 was very salutary and had created a new interest in hypertension. However, while it was interesting and stimulating, the work had as yet been of little help to the clinician. With regard to the aetiology of hypertension in general, many conditions, such as paroxysmal hypertension with pheochromocytoma, coarctation of the aorta, polycystic kidneys, renal tumour and chronic pyelonephritis, had been found to be responsible. In renal hypertension the cause most commonly encountered was chronic atrophic pyelonephritis. Yet besides the renal factors there was the important substratum, the hereditary factor without which hypertension was unlikely to be provoked. Hypertension did not always accompany these renal lesions, and when it did it was only in a small proportion of cases that the blood pressure was reduced by operation.

With regard to the frequency with which a unilateral renal lesion was responsible for hypertension, Edgar Allen had said that it could be demonstrated in less than 1 in 300 cases. Kennedy, a paediatrician at the Mayo Clinic, had said that in his work it was found in about 1% of cases. The question arose whether a full renal investigation should be carried out as a routine to exclude a renal origin in every case of hypertension. The difficulty encountered here was the cost. In practice, unless there was obvious evidence of present or previous kidney trouble, it was reasonable not to pursue a renal origin by detailed urological study.

DR. BYROM had referred to structural changes in the kidney. There was still considerable disagreement about which came first, hypertension or renal changes. In essential hypertension arteriolar sclerosis was found in the kidney in 100% of cases, whereas no other organ was affected to so great a degree. This suggested that vascular renal changes originated the condition of hypertension, and this was the trend of present-day opinion. Those, however, who performed sympathectomy in essential hypertension did not concede that the renal theory was yet proved. The peripheral arteriolar constriction might yet be of sympathetic vasomotor origin similar to that produced experimentally in dogs by Heymans.

With reference to the reduction of blood pressure by operation, Volini and Flaxman in 1938 had followed up fifty odd hypertensive patients subjected to various non-neurosurgical procedures and concluded that the reduction in blood pressure was as satisfactory as that produced by specific sympathetic system operations for hypertension up to that time.

Dr. Gibson had referred to the blood pressure in pregnancy. Dr. Shallard thought that in general practice, while the urine was customarily analysed for albumin, the blood pressure was estimated comparatively infrequently and that more attention could be paid to it. With regard to the use of sodium sulphocyanate in toxæmia of pregnancy, Dr. Shallard said that he had had no experience with it; but, as renal insufficiency was usually not present, if the concentration of the drug in the blood was controlled he thought that there should be no danger.

In reply to Dr. Stokes, Dr. Shallard said that opinions emanating from the Peter Bent Brigham Hospital were probably those of Dr. Soma Weiss, who was a keen critic of methods, such as sympathectomy, which aimed at reducing the blood pressure. Dr. Stokes had referred to the apparent immunity to essential hypertension of the Chinese in China; Dr. Shallard pointed out that the Chinese living in America could become hypertensive. In the same way Negroes living in the African jungle were free from hypertension, whereas the incidence of it among Negroes living in American cities was greater than in the whites. Dr. Coppleson had referred to the actual technique of operation. Dr. Shallard said that Peet performed it in one stage, and that might have had something to do with the twelve operative deaths which he had reported. At the Mayo Clinic the two-stage operation was carried out at an interval of ten days. At the time of Dr. Shallard's visit a further hundred odd patients had been operated upon since Dr. Coppleson's visit and the mortality rate in these too had been nil. In reply to Dr. Reading, Dr. Shallard said that the blood pressure did vary in the two arms up to about 10 millimetres of mercury. If the difference exceeded 15 millimetres, then something was wrong and some vascular lesion, such as aneurysm, should be suspected. The blood pressure should be recorded with the patient in the recumbent position; if he were in the erect position the figures would not be so accurate. In discussing the question raised by Dr. Calov, Dr. Shallard said that the diastolic point had caused some difference of opinion. For the sake of clearness, in some American centres the blood pressure was recorded in three lots of figures, indicating the first systolic sound, the point where the sound became dulled, and the point at which it disappeared (for example, 170/100-85). With regard to the use of venesection, Dr. Shallard said that he had seen patients derive symptomatic benefit from that form of treatment. It was impressive to see blood taken away, and it was possible that the benefit might have been psychological. After venesection the blood viscosity was reduced to some extent, but the blood pressure fell for hours only rather than days, if at all. Red cell and plasma protein loss was easily replaced within six weeks. No lasting improvement could be expected from venesection.

With regard to the use of cholinergic drugs, Dr. Shallard thought that their effect was not of sufficiently long duration for them to be of any value.

Referring to the age groups of patients with essential hypertension, Dr. Shallard said that a systolic blood pressure of 200 millimetres of mercury was much more dangerous in a person aged thirty years than in a person, for instance, aged fifty-five years. Sympathetic operations had been carried out mainly in the younger groups.

When the diastolic pressure reached 120 millimetres the prognosis was poor, as the malignant phase would not be long delayed. There were two forms of malignant hypertension, one occurring as a primary disease in young adults, often in their twenties, and the other terminating a long-standing benign hypertension in patients of more advanced age.

In reply to Dr. Edwards, who had referred to the reduction of blood pressure as a result of the treatment of certain urological conditions, Dr. Shallard said that there were many surgical procedures on the renal tract which had been accredited with relief of hypertension. Dr. Shallard said that it had even been suggested that in the toxæmia of pregnancy the hypertension was due to the pressure of the gravid uterus upon the ureters. Dr. Edwards had brought forward the importance of renal hypertension and its treatment, but demonstrable renal lesions were only of occasional importance in the treatment of hypertension.

COLONEL WILFRED VICKERS, from the chair, thanked Dr. Shallard for his paper. Colonel Vickers said that he had taken much trouble and that subsequent speakers had attacked the subject from almost every angle. The result was a discussion that would provoke a considerable amount of thought. Colonel Vickers also expressed gratitude to Dr. T. W. Lipscomb and the members of the New South Wales Permanent Post-Graduate Committee in Medicine for the interesting film shown at the meeting.

National Emergency Measures.

CONTROL OF MEDICAL EQUIPMENT ORDER.

THE following Control of Medical Equipment Order is reproduced from the *Commonwealth of Australia Gazette*, Number 17, of January 16, 1942.

In pursuance of regulation 7 of the National Security (Medical Co-ordination and Equipment) Regulations, 1, Frederick Arthur Maguire, Chairman of the Central Medical Co-ordination Committee, acting upon the recommendation of the Medical Equipment Control Committee, hereby make the following Order:

1. This Order, as amended from time to time, may be cited as the Control of Medical Equipment Order.

2. The Control of Medical Equipment Order (No. 1) made on the twenty-ninth day of April, 1941, and published in the *Gazette* on the twelfth day of May, 1941, is hereby revoked.

3. For the purposes of this Order—
"registered" means registered under the law of a State or Territory of the Commonwealth;
"specified drugs" means the drugs specified in the Schedule to this Order.

4. A person shall not sell any of the drugs specified in the Schedule to this Order, or any preparation or admixture containing any proportion of any drug so specified, except on the written prescription or order of a registered medical practitioner or a registered veterinary surgeon, issued in the ordinary course of his practice:

Provided that nothing contained in this paragraph shall preclude the sale or supply of any drug so specified by a wholesale druggist, in the normal course of a wholesale dealing—

(a) to a registered medical practitioner, a registered dentist, or a registered pharmaceutical chemist, for use in the ordinary course of his practice or business, or
(b) upon the written order of the person in charge of a hospital or a Government department or institution:

Provided further that the Chairman of the Medical Equipment Control Committee may issue to any person a permit in writing authorizing him to purchase such quantities of any of the specified drugs as are set out in the permit, and, upon delivery of the permit to a wholesale druggist, that druggist may sell or supply to the holder of the permit such quantities of the specified drugs as the holder is authorized under the permit to purchase.

5. (1) Every medical practitioner or registered veterinary surgeon who writes a prescription which includes any of the specified drugs shall indicate clearly in the prescription the quantity to be dispensed and the number of times which, in his opinion, it will be necessary to dispense the prescription.

(2) Every person who dispenses the prescription shall cause his name to be indelibly marked thereon by stamp or other means.

(3) If a prescription for any of the specified drugs does not indicate the number of times which it will be necessary to dispense it, the prescription shall not be dispensed more than twice.

(4) The person who dispenses the prescription on the last occasion, as determined in accordance with the preceding sub-paragraphs, shall stamp, mark or inscribe in durable and legible letters across the face of the prescription the word "Cancelled".

(5) A person shall not dispense a prescription for any of the specified drugs if—

(a) the prescription has been marked "Cancelled" in accordance with the last preceding sub-paragraph; or
(b) he has reasonable cause to believe that the prescription has already been dispensed the maximum number of times permitted under this Order; or
(c) he has reasonable cause to suspect that the prescription is a forgery.

(6) Every pharmaceutical chemist shall keep in his prescription book a record of all prescriptions dispensed by him in which any of the specified drugs are included, the name and address of each person to whom such drugs were supplied, and the quantity of drugs supplied to each person, and shall, upon demand by an authorized officer, produce his prescription book for examination by that officer.

6. A person shall not use, or authorize or permit the use of, surgical gauze or surgical bandage cloth except for medical or surgical purposes.

The Schedule.

List of Drugs to be Sold only on Medical Prescription.

Antimony and Potassium Tartrate;
Antimony and Sodium Tartrate;
Atropine and Salts;
Chinifonum compounds such as Quinoxyl, Yatren, Loretin;
Emetine and Salts;
Ergot and all preparations and Alkaloids thereof;
Filix Mas and Extracts;
Hyoscine and Salts;
Liver Extracts for parenteral administration, such as Anahemin; Campolon; Examen; H.C.L.; Hepastab; Hepatex-T; Liver Ext. B.D.H.; Liver Extract Intramuscular (Parke Davis & Co.); Neo-hepatex; Pernemon; Recticulogen;
Local Anaesthetics such as Butyn; Decicain; Diocaine; Metycaine; Percaine; Tutoxaine;
Metrazol compounds such as Cardiazol; Phrenazol; Leptazol;
Nikethamide compounds such as Coramine; Calcio-Coramine; Icoral; Solucamphre; Anacardone;
Oleum Iodisatum preparations such as Iodatol; Iodinol; Iodipin; Lipiodol; Neo-Hydriol; and other analogous iodine compounds such as Abrodl; Perabrodil; Tenebryl; Iodoxyl; Pyelectan; Uropac;
Organic Arsenic compounds such as Acetarsol; Acetylarsan; Devegan; Kharophen; Orarsan; Spirocid Stovarsol; Neoarsphenamine; Neo-Karsivan; Neo-Salvarsan; N.A.B. Novarsan; Novostab; Marpharsen; Tryparsamide; Treparsol; Carbarsone;
Paraldehyde;
Physostigmine and Salts;
Procaine Hydrochloride and all proprietary brands of paminobenzyldiethylaminoethanol; also all related drugs used by percutaneous injection for local or spinal anaesthesia;
Quinidine and Salts;
Sulphonamides;
Sulphonamides and preparations allied to or derived from sulphonamides, whether described as 693 M & B, Prontosil, Alburn, Streptocide, Colsulanyde, Prontosil Red, Pro-septasine, Soluseptasine, or by any other Trade Name;
Synthetic Antimalarials such as Quinacrine; Praequine; Plasmoquine; Atebrin.

Dated this twelfth day of January, 1942.

F. A. MAGUIRE,
Chairman, Central Medical Co-ordination Committee.

Naval, Military and Air Force.

APPOINTMENTS.

THE undermentioned appointments, changes et cetera have been promulgated in the *Commonwealth of Australia Gazette*, Number 15, of January 15, 1942.

ROYAL AUSTRALIAN AIR FORCE.
Citizen Air Force: Medical Branch.

Temporary Flight Lieutenant J. S. Baird is transferred from the Reserve to the Active List, with effect from 18th April, 1941, and is promoted to temporary Squadron Leader, with effect from 19th April, 1941, with seniority next after Temporary Squadron Leader P. J. Egan.

Notification appearing in *Commonwealth of Australia Gazette* No. 96, dated 21st August, 1941, referring to Flight Lieutenant J. S. Baird, is cancelled.

The appointment of Flight Lieutenant B. P. K. Ryan is terminated, with effect from 1st November, 1941.

William Carrick Turk Upton, M.B., M.S., is appointed to a commission on probation with the rank of Flight Lieutenant and is granted the acting rank of Squadron Leader whilst employed as a Squadron Leader, with effect from 7th November, 1941.

The following Flight Lieutenants are transferred from the Reserve to the Active List, with effect from the dates indicated: N. G. J. Simpson, 27th October, 1941; A. G. R. Uglow, T. W. Capell, N. Oldfield, J. W. L. Price, W. A. R. Smith, 3rd November, 1941.

The following are appointed to commissions on probation with the rank of Flight Lieutenant, with effect from the dates indicated: Samuel David Mecoles, M.B., B.S., Norman Duffin Barr, B.Sc., M.B., B.S., Donald Joseph Dowling, M.B., B.S., John Nelson Sevier, M.B., B.S., William Hamilton Smith, M.B., B.S., 3rd November, 1941.

The following Flight Lieutenants are granted the acting rank of Squadron Leader whilst employed as Squadron Leaders with effect from the dates indicated: M. J. Barrett, 21st November, 1941; K. E. Rex, R. G. Plummer, 1st November, 1941; N. E. Allen, R. T. McCaul, 21st November, 1941; R. W. Hazelton, A. J. Campbell, D. C. Trainor, 1st November, 1941.

The following Flying Officers are granted the acting rank of Flight Lieutenant whilst employed as Flight Lieutenants, with effect from 1st October, 1941: J. P. Esslemont, C. O. Duffy, D. P. Felton.—(Ex. Min. No. 6—Approved 7th January, 1942.)

The probationary appointments of the following temporary Squadron Leaders are confirmed: E. M. Fisher, K. E. Shellshear, A. B. K. Watkins, T. G. Millar.

The probationary appointments of the following Flight Lieutenants are confirmed: R. M. Alder, H. J. Prior, P. M. Davidson, J. Devidas.

The probationary appointment of Pilot Officer C. M. Waters is confirmed and he is promoted to Flying Officer with effect from 21st October, 1941.—(Ex. Min. No. 10—Approved 7th January, 1942.)

The following is appointed to a commission on probation with the rank of Flight Lieutenant, with effect from the date indicated: William Allan McKay, M.B., B.S. (17th November, 1941).

The following Flight Lieutenants are transferred from the Reserve to the Active List, with effect from 1st December, 1941: T. F. Ahern, I. R. Barrie, K. J. Basedow, J. D. Bishop, B. N. O. Colahan, C. B. Hudson, R. D. Macbeth, A. R. Robinson.

The appointment of Flight Lieutenant D. J. Biddle is terminated, with effect from 17th December, 1941.

Reserve: Medical Branch.

The following are appointed to commissions on probation with the rank of Flight Lieutenant, with effect from the dates indicated: William Alexander Leventhal, M.B., B.S., 10th October, 1941; Henry Roy Clegg, M.B., B.S., 21st October, 1941; Colin Robert Laing, M.B., B.S., 28th October, 1941.—(Ex. Min. No. 3—Approved 7th January, 1942.)

The following are appointed to commissions on probation with the rank of Flight Lieutenant, with effect from 6th November, 1941: Ernest Richard Glenister Shell, M.B., B.S., Richard Cunyngham Ople, M.B., B.S., Arthur James Lundie, M.B., B.S., John Howie Isles, M.B., B.S.—(Ex. Min. No. 5—Approved 7th January, 1942.)

Flight Lieutenant A. G. R. Uglow is transferred from the Active List to the Reserve, with effect from 1st December, 1941.

The following are appointed to commissions on probation with the rank of Flight Lieutenant, with effect from 21st November, 1941: Henry Bennett Little, M.B., Ch.M., Kenneth William Macleod, M.B., B.S., Frederick Charles Middleton, M.B., B.S.—(Ex. Min. No. 7—Approved 7th January, 1942.)

The following are appointed to commissions on probation with the rank of Flight Lieutenant, with effect from the dates indicated: Kenneth Francis Brennan, M.B., B.S., Francis Joseph McCoy, M.B., B.S. (8th December, 1941), Hugh Graham Andrews, M.B., B.S. (17th December, 1941).—(Ex. Min. No. 13—Approved 14th January, 1942.)

LECTURES IN ARMY MEDICINE AT ADELAIDE.

COLONEL A. R. SOUTHWOOD, Deputy Director of Medical Services of the Fourth Military District, announces that a series of lectures in army medicine will be held at Adelaide. The main theme of the lectures will be tropical diseases, and they will be delivered at the Institute of Medical and Veterinary Science, Adelaide, at 8.30 o'clock p.m. in each instance. The lectures will be open to officers on the active and reserve lists of the Australian Army Medical Corps, to members of the Australian Army Nursing Service, and to senior non-commissioned officers of Australian Army Medical Corps units. Medical officers of the Royal Australian Navy and of the Royal Australian Air Force are invited to attend. An invitation is also extended to medical practitioners and medical students. The programme is as follows:

Wednesday, February 11.—"The Dysenteries", "Dengue", "Tropical Ulcer", "Tropical Skin Diseases": Captain C. M. Deland, Professor J. B. Cleland.

Wednesday, February 18.—"Lice, Flies, Bugs and Fleas": Professor J. Davidson; "Recent Changes in Field Ambulance Work": Colonel A. R. Southwood, E.D., Major J. L. Hayward.

Wednesday, February 25.—"Diagnosis of Fever in the Tropics": Captain C. M. Deland; "Remarks on the Major Quarantineable Diseases": Captain F. W. A. Ponsford.

Wednesday, March 4.—"Anti-Gas": Captain S. J. Bavistock, Lieutenant S. W. Fewell.

Wednesday, March 11.—"The Medical Officer on Sea Transport and in a Convalescent Depot": Captain H. G. Prest; "Recent Advances in Medicine as Observed in the Middle East": Lieutenant-Colonel E. Britten Jones.

A course of instruction in tropical diseases will also be held at Camp Hospital, Wayville. These lecture-demonstrations will be conducted by Captain C. M. Deland. The course, which began on January 27, 1942, will extend over a period of six weeks, and demonstrations on Tuesday and Friday afternoons from 4.30 to 5.30 o'clock p.m.

CASUALTIES.

ACCORDING to the casualty list received on January 28, 1942, Captain D. M. G. Denehy, A.A.M.C., Melbourne, Victoria, is reported missing.

The Royal Australasian College of Physicians.

EXAMINATION FOR MEMBERSHIP.

UNDER existing conditions it has been found necessary to alter the arrangements originally made for the forthcoming examination for Membership of the Royal Australasian College of Physicians. For the convenience of candidates the clinical portion of the examination will now be conducted in Sydney, Melbourne and Adelaide.

The dates upon which the examination will be held are as follows:

Written examination: Capital cities, Saturday, March 14, 1942.

Clinical examination: Sydney, Saturday, April 11, 1942; Adelaide, Wednesday, April 15, 1942; Melbourne, Thursday, April 16, 1942.

Application forms may be obtained from the office of the College, 145, Macquarie Street, Sydney, and should be in the hands of the Acting Honorary Secretary not later than Saturday, February 14, 1942.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Bartlett, Francis Kelvin, M.B., B.S., 1941 (Univ. Sydney), Royal North Shore Hospital of Sydney, St. Leonards.

Edwards, Roger Henry, M.B., B.S., 1941 (Univ. Sydney), Royal Prince Alfred Hospital, Camperdown.

Grant, Lindsay Ian Hamilton, M.B., B.S., 1941 (Univ. Sydney), "Withycombe", 31, Elizabeth Street, Ashfield.

Lane, John Charles, M.B., B.S., 1941 (Univ. Sydney), Sydney Hospital, Sydney.

Obituary.

DOMINIC VICTOR SHEIL.

We regret to announce the death of Dr. Dominic Victor Sheil, which occurred on January 26, 1942, at Southport, Queensland.

Notice.

A MEETING of the Medical Board of the Royal Prince Alfred Hospital will be held on Thursday, February 12, 1942, in the A2 Lecture Theatre at 4.30 o'clock p.m. The clinical section will last approximately one hour. Demonstrations will be given by Dr. T. M. Greenaway and Dr. J. A. McGeorge. Medical practitioners are invited to attend.

Diary for the Month.

FEB. 10.—Tasmanian Branch, B.M.A.: Branch.
FEB. 13.—Queensland Branch, B.M.A.: Council.
FEB. 18.—Western Australian Branch, B.M.A.: Branch.
FEB. 26.—South Australian Branch, B.M.A.: Branch.
FEB. 27.—Queensland Branch, B.M.A.: Council.
FEB. 27.—Tasmanian Branch, B.M.A.: Council.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Honorary Secretary, 135, Macquarie Street, Sydney): Australian Natives' Association; Ashfield and District United Friendly Societies' Dispensary; Balmain United Friendly Societies' Dispensary; Leichhardt and Petersham United Friendly Societies' Dispensary; Manchester Unity Medical and Dispensing Institute, Oxford Street, Sydney; North Sydney Friendly Societies' Dispensary Limited; People's Prudential Assurance Company Limited; Phoenix Mutual Provident Society.

Victoria Branch (Honorary Secretary, Medical Society Hall, East Melbourne): Associated Medical Services Limited; all Institutes or Medical Dispensaries; Australian Prudential Association, Proprietary, Limited; Federated Mutual Medical Benefit Society; Mutual National Provident Club; National Provident Association; Hospital or other appointments outside Victoria.

Queensland Branch (Honorary Secretary, B.M.A. House, 225, Wickham Terrace, Brisbane, B.17): Brisbane Associated Friendly Societies' Medical Institute; Bundaberg Medical Institute. Members accepting LODGE appointments and those desiring to accept appointments to any COUNTRY HOSPITAL or position outside Australia are advised, in their own interests, to submit a copy of their Agreement to the Council before signing.

South Australian Branch (Honorary Secretary, 178, North Terrace, Adelaide): All Lodge appointments in South Australia; all Contract Practice appointments in South Australia.

Western Australian Branch (Honorary Secretary, 205, Saint George's Terrace, Perth): Willuna Hospital; all Contract Practice appointments in Western Australia.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this journal. The management cannot accept any responsibility unless such a notification is received within one month.

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in the Commonwealth can become subscribers to the Journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rates are £1 for Australia and £1 5s. abroad per annum payable in advance.